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SUBJECT: Submits info re automatic depressurization sys timer setting & justification for setting,in response to NRC 830425 ltr re TMI Item II.K.3.18.

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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
TMI ITEM II.K.3.18
ER 100450 FILE 841-2 Docket Nos. 50-387
PLA-1734 50-388

Dear Mr. Schwencer:

This letter is in response to your letter of April 25, 1983 and provides the ADS timer setting and justification for this timer setting.

INTRODUCTION AND SUMMARY

This letter summarizes the results of a study to determine the acceptable range of settings for the new Automatic Depressurization System (ADS) bypass timer. This new timer will be initiated by a level 1 water level signal. Once this new timer has run out, the current 2 minute ADS timer will initiate on water level alone, thus eliminating the need for a high drywell pressure signal. This additional ADS initiating logic is intended as a backup to manual initiation of the ADS by the operator for inventory threatening events which do not generate a high drywell pressure signal. Examples of these events are breaks outside the containment and system isolation with failure of all high pressure makeup systems.

The acceptable range of timer settings is determined by consideration of Loss-of-Coolant Accidents (LOCAs), inventory threatening transients, and Anticipated Transients Without Scram (ATWS) events. The acceptable range of timer settings was determined to be greater than or equal to 480 seconds and less than or equal to 1300 seconds. ATWS considerations are controlling in determination of the minimum value while transient and LOCA considerations determine the maximum value. All evaluations are based on realistic models and assumptions and then assessed against corresponding calculations based on 10CFR50.46 Appendix K models and assumptions.

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ASSUMPTION USED IN ANALYSES

This modification to the ADS will only affect those inventory threatening events which do not generate a high drywell pressure signal. These events include LOCAs outside the containment which are represented by the maximum Outside Containment Steamline Break (OSLB) case, inventory threatening transients which are represented by an isolation event with a Stuck Open Relief Valve (SORV), and the ATWS event.

For the LOCA and transient analyses a failure of the DC power source common to the HPCI, 1 LPCS and 1 LPCI is assumed. This is the worst single failure for the above cases since it eliminates the high pressure ECC system as well as some low pressure ECCS capability. In addition, no credit is taken for RCIC or CRD operation.

The assumptions for the realistic calculations are consistent with the previous calculations to support the Emergency Operator Guidelines. These assumptions include the best estimate decay heat curve and steam cooling effects. These calculations will be assessed against corresponding calculations based on 10CFR50.46 Appendix K models and assumptions.

MINIMUM TIMER SETTING EVALUATION

ATWS considerations are controlling in determination of the minimum timer setting. The minimum setting must allow enough time for the Standby Liquid Control system to sufficiently reduce reactivity levels in the core to allow the high pressure makeup system to restore water level above level 1. This minimum value has been determined to be 480 seconds for Susquehanna SES.

Based on realistic assumptions, both the OSLB and SORV cases were analyzed assuming a minimum timer setting of 480 seconds. Water level, vessel pressure and peak cladding temperature versus time for the OSLB results show that the new ADS timer was initiated on a level 1 signal at approximately 1200 seconds. At approximately 1680 seconds the new ADS timer ran out and since at this time the water level was still below level 1, the second ADS timer initiated. Finally at approximately 1800 seconds the second timer ran out and the ADS was initiated. For the SORV there were similar results and sequence of events culminating in ADS actuation at approximately 1500 seconds. For these cases the calculated peak cladding temperature was less than or equal to 750°F.

MAXIMUM TIMER SETTING EVALUATION

Transient and LOCA considerations are controlling in determination of the maximum timer setting. The maximum timer setting is chosen for these events such that the duration of core uncovery is limited and significant core damage prevented. For analyses with a long ADS timer setting, the SORV case yielded the highest peak cladding temperature and hence determined the maximum timer setting. After several iterations it was determined that an ADS timer setting of 1300 seconds would yield a peak cladding temperature of 2200°F for the SORV case based on realistic assumptions.

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ASSESSMENT AGAINST 10CFR50.46 APPENDIX K MODELS

Calculations for the SORV and OSLB were performed assuming the minimum timer setting of 480 seconds and based on 10CFR50.46 Appendix K models and assumptions. Both cases yielded acceptable results since the calculated peak cladding temperature is approximately 1500°F, which is substantially below the 2200°F. Also for both cases ADS actuation occurs at approximately 1200 seconds after the initiation of the transient, which is consistent with the previous licensing calculation presented in the Susquehanna FSAR, Section 6.3.

CONCLUSION

The 480 seconds was selected for the new ADS timer, since it satisfies all areas of concern, allows sufficient time for operator action, minimizes core heatup, and is consistent with ATWS 2A or ATWS 3A requirements.

Very truly yours,

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

cc: R. L. Perch - NRC