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AUTH. NAME AUTHOR AFFILIATION
 BYRAM, R.G. Pennsylvania Power & Light Co.
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SUBJECT: Submits Deviation Request 41 from interpretation of App R requirements for control room fire for MOV "Hot Short" issue.

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Pennsylvania Power & Light Company

Two North Ninth Street • Allentown, PA 18101-1179 • 610/774-5151

Robert G. Byram
Senior Vice President-Nuclear
610/774-7502
Fax: 610/774-5019

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U.S. Nuclear Regulatory Commission
Attn.: Document Control Desk
Mail Stop P1 - 137
Washington, D.C. 20555

**SUSQUEHANNA STEAM ELECTRIC STATION
PROPOSED DEVIATION FROM APPENDIX R
MOV-HOT SHORT ISSUE (NRC IN 92-18)
PLA-4341 FILES A17-15/A18-15/A20-3**

Docket Nos. 50-387/NPF-14
and 50-388/NPF-22

This letter is provided in response to questions from members of your staff regarding our proposed deviation (Deviation Request No. 41) from the interpretation of the Appendix R requirements for the Control Room fire for the MOV "Hot Short" issue.

Background

Our current Control Room Fire Analysis was performed to meet the requirements of 10 CFR 50 Appendix R Section III.L and NRC Generic Letter 86-10, including Section 3.8.4, Control Room Fire Considerations. In accordance with the direction provided in these documents, we have performed a bounding analysis assuming that the fire causes evacuation of the Control Room and that safe shutdown is accomplished from outside of the main Control Room.

In performing this analysis, associated circuits were evaluated to assure isolation from those systems and equipment required to support safe shutdown. This analysis included an evaluation to assure that hot shorts, open circuits and short to ground would not prevent safe shutdown equipment and systems from performing their function.

With respect to the hot shorts on the circuits that can be isolated at the Remote Shutdown Panel, however, consideration was given only to equipment change of state and not to potential equipment damage. The intent of Deviation Request No. 41 was to provide justification for not including the potential effects of equipment damage into the Control Room Fire Analysis.

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Deviation Requested:

Our request seeks relief from including consideration of equipment damage states due to hot shorts and the time factor required for this damage to occur in the SSES Control Room Fire Analysis. The deviation request does not seek generic relief from considering the other aspects of the Control Room fire required by 10 CFR 50 Appendix R Section III.L and NRC Generic Letter 86-10.

The MOV "hot short" damage issue postulates a low probability event involving specific timing considerations that are not currently included within the bounds of the SSES Control Room Fire Analysis. Consideration of this factor with all of the other factors currently used in the SSES Control Room Fire Analysis has a potential to lead to an inability to achieve and maintain cold shutdown unless certain circuit modifications are made. The sequence of events that would need to be considered for such a result are as follows:

- A Control Room fire must occur.
- The fire must instantaneously develop to the point where all Control Room equipment is damaged and Control Room evacuation is required.
- A Loss of Offsite Power must occur.
- The fire must cause a hot short of the proper voltage and polarity in the control circuitry of a motor operated valve required for safe shutdown (Path 2). Note: Only the existence of precise voltage and polarity conditions will result in the conditions of concern.
- The hot short of proper voltage and polarity must be sustained for a time sufficient to result in unrecoverable damage to the valve motor operator. If the circuit causing the hot shot were to progress to a short to ground or an open circuit during the time required to drive the motor to failure, the potential for equipment damage would be eliminated and operation from the Remote Shutdown Panel would be possible.
- Transfer of control from the control room to the remote shutdown panel must not occur prior to motor failure. Such a transfer would end the postulated scenario (i.e., the control room portion of the circuit with the problem would be removed from the circuit and control of the effected motor operator would be from the remote shutdown panel).

There are, however, other considerations that are also not currently used in the SSES Control Room Fire Analysis, such as:

- the time the fire would take to spread throughout the Control Room and cause equipment damage and the need for evacuation which is a function of
 - the availability of automatic detection and suppression,
 - the characteristics of the combustible materials present
 - the availability of fire propagation pathways
 - the timing of the actions that would routinely be taken by those operations personnel who constantly man the SSES Control Room to mitigate the spread of the fire.
- the time in the fire scenario that operators would actually be required to leave the main Control Room and go to the Remote Shutdown Panel,
- the time required by the operator to travel to the Remote Shutdown Panel,
- the time that the operator would actually transfer control from the Control Room to the Remote Shutdown Panel and
- the time that would be required for the fire to cause sufficient cable damage to even present the potential for a hot short.

When all factors were considered and a realistic fire analysis that balanced the positive and negative factors that can be reasonably postulated for a Control Room fire was performed, the probability of losing all three Appendix R Safe Shutdown Paths was calculated to be approximately 10^{-12} /cycle.

In performing this evaluation, the assumption of a limited or more realistic Control Room fire was used. This assumption was justified on the basis of giving consideration to all of the factors itemized above. The results of this analysis were that shutdown can be accomplished from the main Control Room because operators in the Control Room will take prudent actions to mitigate the affects of the postulated fire. Sufficient time exists for these mitigating actions to be performed because of the physical separation design of the Control Room, the amount and characteristics of combustible materials present, and the lack of fire propagation pathways.

The final conclusion of the analysis is that the occurrence of the equipment damage states caused by a MOV "Hot Short" is an extremely low probability event, particularly when viewed in combination with all other factors, and, therefore, the inclusion of this assumption in the current Control Room Fire Analysis is not warranted.

Summary:

In summary, the Susquehanna fire hazards analysis followed NRC's guidance when it considered a postulated fire in the main control room. Hot shorts, shorts to ground and open circuits were considered. The remote shutdown panels were assured to have proper independence because the transfer switches to remove the control room portion of the circuit and transfer control to the remote shutdown panels are located in each of the remote shutdown panel rooms. Transferring from the control room to the remote shutdown panel inserts a new control power fuse into the circuits.

Additionally, the "hot shorts" issue for Susquehanna is limited to those portions of MOV control circuitry located in the Main Control Room Fire Area. At Susquehanna SES, the cable spreading rooms and relay rooms are each contained in separate fire areas at elevations different from that of the control room. These rooms and the equipment in them will not be affected by a fire in the main control room.

We are asking for relief from the need to include the assumption of a hot short resulting in equipment damage in the Control Room Fire Analysis. We are not requesting relief from the other generic fire requirements applied in the SSES Control Room Fire Analysis.


In addition, as requested by your staff, we are evaluating the number of valves currently covered by this deviation request to determine if the number can be reduced.

Finally, we have requested that a portion of our next quarterly licensing meeting be devoted to a discussion of this issue. During this meeting we propose to review our position and to answer any questions you may have on this letter. We will also update you on our efforts to reduce the number of valves covered by the deviation. Finally, we would like to determine the specific actions on our part required to bring this issue to a close.

We consider this request a Cost Beneficial Licensing Action for Susquehanna because the cost and difficulty associated with making modifications to eliminate the possibility of valve damage occurring are not warranted for the margin of safety gained by making those modifications.

Should you have further questions regarding our request, please contact Mr. W. W. Williams at 610-774-7742.

Very truly yours,


R. G. Byram



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copy: Regional Administrator - Region I
Ms. M. Banerjee, NRC Sr. Resident Inspector
Mr. C. Poslusny, Jr., NRC Sr. Project Manager



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