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U.S. Nuclear Regulatory Commission
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SUSQUEHANNA STEAM ELECTRIC STATION
RESPONSE TO THE REQUEST FOR
ADDITIONAL INFORMATION REGARDING
THERMO-LAG 330-1
NRC GENERIC LETTER 92-08
PLA-4349 **FILE R41-2**

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

This letter responds to your follow-up request for additional information regarding Generic Letter 92-08 dated June 13, 1995. In your letter you requested that we provide a schedule for the completion of all corrective actions identified by our analysis, and additional information concerning ampacity. Our response to your request is provided below. The format for our response is to state your request and then provide our response thereto.

NRC Request for Schedule Information:

The RAI dated September 23, 1994, requested information regarding important barrier parameters, Thermo-Lag barriers outside the scope of the NEI program, ampacity derating, and schedules. In the licensee's response dated December 22, 1994, a schedule for the completion of the corrective actions necessary for the resolution of the Thermo-Lag issue was not provided. A schedule for the completion of all corrective actions is requested.

PP&L's Response:

As discussed in the November 29, 1994 meeting on the NEI Applications Guide held at the Susquehanna Station and in our December 22, 1994 response to your RAI dated September 23, 1994 (PLA-4236), the primary focus of our Thermo-Lag Resolution Strategy is the elimination of unnecessary Thermo-Lag fire barriers. The vehicle for identifying required fire barriers is the Appendix R Safe Shutdown Analysis. To eliminate unnecessary fire barriers requires a major revision to the Appendix R Safe Shutdown Analysis.

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A previous major revision to the Appendix R Safe Shutdown Analysis was performed in 1985 in response to questions raised during a 1985 NRC Appendix R Inspection. That particular effort, which is comparable in scope to the current effort now being undertaken, took approximately 4 years to complete.

Based on our experience with this type of work, we know the following:

- There is a great deal of conservatism in our current analysis that will enable the elimination of a significant number of raceway fire barriers.
- The time required to complete such a major effort is on the order of 3 to 4 years.
- The exact plant changes resulting from such an analysis cannot be completely predicted ahead of time.
- The analysis is very complicated and must be performed carefully so that it can be properly integrated with the other aspects of plant design and operation.

Because of these issues, the commitment provided in our December 22, 1994 response stated: "Our current plan is to complete those actions identified in our corrective action plan necessary to identify the scope of required modifications by the end of the Unit 2-8RIO, scheduled to end in the 2nd quarter of 1997. At that time, we will provide a schedule for completing any required modifications." At that time, our work on revising the Appendix R Safe Shutdown Analysis was just beginning and, we were unable to assess the magnitude of the physical work that would result from the effort. Without this knowledge, we were unable to provide a firm date for the completion of all corrective actions.

Although our revision to the Appendix R Safe Shutdown Analysis is approximately 50% complete, the full scope of required physical changes is still not known. Our progress to date, however, provides us with reasonable assurance that any required physical changes can be accomplished in one station outage cycle.

The start of the first full outage planning cycle beyond our current commitment date to you on this issue begins September 5, 1997. This is the start of the outage planning cycle for the Unit 1-11RIO and the Unit 2-10RIO. Our commitment is to complete all corrective actions necessary for the resolution of the Thermo-Lag issue by the end of this outage cycle. This would place the completion date around the end of the year 2000.

NRC Request for Information on Ampacity:

During the public meeting held on March 14, 1995, with the licensees for the four lead plants for the resolution of Thermo-Lag issues, the staff responded to the question "Will the resolution of the ampacity derating concern be deferred until agreement is reached on the appropriate testing protocol (i.e., IEEE P848)?" The staff reiterated the position which was previously stated in the

September 1994 RAI, that the ampacity derating concern could be resolved independently of the fire endurance concerns. At this time the staff is not aware of any NEI initiative to address the ampacity derating issue. After a review of the tests results which were performed under the draft IEEE standard P848, the staff transmitted comments which were designed to ensure the repeatability of test results to the IEEE Working group responsible for the test procedure. The licensee is requested to submit it's ampacity derating evaluations, including any test reports in order to provide an adequate response to Generic Letter 92-08 reporting requirement 2.(c).

PP&L's Response:

We have completed a preliminary evaluation of ampacity derating for those power circuits at Susquehanna that are contained in raceway protected with Thermo-Lag. The evaluations are considered to be preliminary because they are based on our preliminary Thermo-Lag walkdowns without confirmatory destructive examinations or detailed parameter walkdowns. As stated in our previous response, Thermo-Lag destructive examinations and detailed parameter walkdowns will not be completed until after the Appendix R Safe Shutdown Analysis revision is completed and the population of required barriers is known.

These evaluations are based upon a comparison of our calculation of the allowable derating factor that can be tolerated by our circuits and the results of ampacity testing performed by TUEC. The specific TUEC testing used was "Ampacity Derating of Fire Protected Cables" dated March 19, 1993. We have reviewed the TUEC tested configurations and have concluded that they are, generally, representative of the configurations used at Susquehanna.

The results of our evaluation are summarized below. For all cases, except 3-hour conduits on Unit 2, the allowable deratings are greater than the derating factors derived from the test program. In addition, the allowable derating factors are also greater than the NRC corrected values provided in the TUEC Comanche Peak Unit 2 SER dated June 14, 1995.

Free Air Cables				
	SSES Min. Allowable Derate	Ampacity Derate		
		TUEC Test		NRC Corrected Value
		Small	Large	
Unit No. 1	37.6 %	21.3 %	31.7 %	N/A
Unit No. 2	49.3 %	21.3 %	31.7 %	N/A

Cable Tray				
	SSES		Ampacity Derate	
	Fire Barrier Rating	Min. Allowable Derate	TUEC Test	NRC Corrected Value
Unit No. 1	1-hour	38.5 %	31.5 %	N/A*
Unit No. 2	1-hour	36.9 %	31.5 %	N/A*

* A 37.7% derating was used for a non-standard tray configuration of two trays in the same enclosure.

Conduit				
	SSES		Ampacity Derate	
	Fire Barrier Rating	Min. Allowable Derate	TUEC Test	NRC Corrected Value
Unit No. 1	1-hour	28.9 %	10.7 %	21 %**
Unit No. 2	1-hour	31.8 %	10.7 %	21 %**
Unit No. 1	3-hour	59.5 %	N/A	N/A
Unit No. 2	3-hour	31.8 %	N/A	N/A

** Based on TUEC's small air drop ampacity derating test.

Three hour conduit was not tested by Comanche Peak. Susquehanna has only 11 power conduits with 3-hour Thermo-Lag protection. These 11 conduits and their circuits along with the allowable ampacity derating on each circuit are summarized below. As stated on page 8 of the Comanche Peak SER, changes in the thickness of the barrier are expected, based on the results of testing and analysis, to have only a secondary (i.e. minor) effect on ampacity. Due to the wide margin between the derating factors from the 1-hour testing and the allowable derating for the circuits in these raceways, we consider these conduits to be bounded by the TUEC testing.

Conduit with 3-hour Fire Barrier		
Conduit	Cable	Maximum Allowable Derating
A2P008	EP2D0005A E2PD0005K	31.8 % 31.8 %
A2P009	AP2D0001A EP2D0015N JP2D0016D	67.4 % 96.4 % 100.0 %
A2P031	AP2D0015F	98.6 %
F2P291	FP2Q0616A FP2Q0616B	100.0 % 100.0 %
D1P025	DP1D0022K	87.5 %

Conduit with 3-hour Fire Barrier		
Conduit	Cable	Maximum Allowable Derating
F1P601	FP0V1195A	100.0 %
A1P075	AP1D0001A	77.2 %
A2P016	AP2D0001A	67.4 %
A1P105	AP0D0061G	99.6 %
	AP0D0061M	99.6 %
	AP0D0061R	98.4 %
	AP1D0015C	83.9 %
	AP1D0015U	99.8 %
	AP1D0016K	78.6 %
	AP1D0016M	99.8 %
	AP10ZZ005	Spare
	EP0D0061S	99.5 %
	EP0D0061T	99.1 %
	EP1D0015N	100.0 %
	EP1D0016F	97.9 %
	EP1D0016H	97.5 %
C1P107	CP0D0063G	99.6 %
	CP0D0063M	99.6 %
	CP0D0063N	99.6 %
	CP0D0063R	98.4 %
	CP1D0019C	83.6 %
	CP1D0019U	99.8 %
	CP1D0020K	78.6 %
	CP1D0020M	100.0 %
E1P005	AP0D0061G	99.6 %
	AP0D0061M	99.6 %
	AP0D0061R	98.4 %
	AP1D0001A	77.2 %
	AP1D0015C	83.9 %
	AP1D0015U	99.8 %
	AP1D0016K	78.6 %
	AP1D0016M	99.8 %
	AP10ZZ005	Spare
	EP0D0061S	99.5 %
	EP0D0061T	99.1 %
	EP1D0015N	100.0 %
	EP1D0016F	97.9 %
	EP1D0016H	97.5 %
	EP1SP0001	Spare
	EP1Y0013H	88.3 %
	PP1B0057A	59.5 %
	PP1B0057B	100.0 %

Therefore, provided the results of the Susquehanna destructive examinations and detailed field walkdowns are able to demonstrate that all of the installed configurations are consistent with the TUEC tested configurations, we do not consider ampacity derating to be a significant concern at Susquehanna in that wide margins exist and that closure will proceed directly upon configuration confirmation.

As stated above, destructive examinations and detailed field walkdowns are required to finalize the ampacity issue for Susquehanna. These will be performed in conjunction with the destructive examinations and detailed field walkdowns performed for the Thermo-Lag fire endurance issue. For the fire endurance issue, these activities will not be performed until the revision to the Appendix R Safe Shutdown Analysis is completed and the final population of required fire barriers is known.

For those barriers that are no longer required, but which represent potential concerns from an ampacity derating standpoint, a decision will be made as to whether the barrier will be physically removed or abandoned-in-place. If the barriers are to be abandoned-in-place, they will be addressed in a manner similar to the required barriers and included as a part of the destructive examination and detailed walkdown programs.

Due to the interdependencies between the Thermo-Lag fire endurance and ampacity issues for Susquehanna, the two issues will be worked together. The schedule for completing all corrective actions for the ampacity issue is, therefore, the same as that for completing the Thermo-Lag fire endurance issue around the end of the year 2000.

Should you have any questions regarding this response, please call W.W. Williams at (610) 774-7742.

Very truly yours,

R. G. Byram

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