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 AUTH.NAME AUTHOR AFFILIATION  
 CURTIS, N.W. Pennsylvania Power & Light Co.  
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 SCHWENCER, A. Licensing Branch 2

SUBJECT: Forwards addl info re turbine-generated missiles, per NRC request during 810730 meeting.

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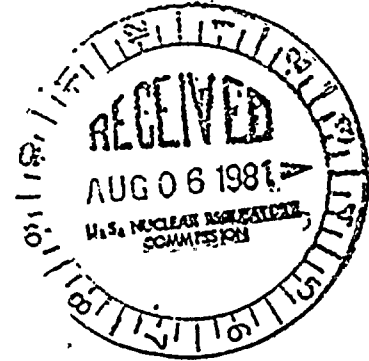
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TWO NORTH NINTH STREET, ALLENTOWN, PA. 18101      PHONE: (215) 770-5151

NORMAN W. CURTIS  
Vice President-Engineering & Construction-Nuclear  
770-5381

August 4, 1981

Mr. A. Schwencer, Chief  
Licensing Branch No. 2  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555



SUSQUEHANNA STEAM ELECTRIC STATION  
TURBINE MISSILE OPEN ITEMS  
ER 100450      FILE 841-02  
PLA-896

Dear Mr. Schwencer:

Attached is the information requested by your Mr. John Schiffgens during our July 30, 1981 meeting on turbine generated missiles. It is our understanding that this information is what you require to close this issue.

In the event that you should have any questions, please call Mr. W. W. Williams at 770-4274.

Very truly yours,

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

WWW/mks

Attachment

*Boal  
5/11*

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P PDR

PENNSYLVANIA POWER & LIGHT COMPANY

## CRD SYSTEM HYDRAULIC CONTROL UNITS

The CRD system hydraulic control units (HCU's) on the north side of the Unit 1 reactor building were considered to be targets for purposes of the probability calculation. As noted in our response to NRC Question #121.21, the probability calculation for P2 X P3 assumes that "unacceptable damage" to the HCU's could result from a turbine missile strike which might cause penetration or spallation of a defined area of the reactor building face wall.

In actuality, postulated turbine missile damage to the HCU's would not necessarily lead to unacceptable consequences. First, as noted above, only the HCU's serving half of the CRD system are within the missile strike zone. The only failure mode of the HCU's which could prevent scram is complete crimping (total blockage) of the CRD withdraw lines. Complete severance of withdraw lines will not affect scram function. Protection for the CRD insert lines is not required during normal reactor operation, since a reactor pressure of 450 psig or higher can adequately scram the control rods. Complete crimping of no more than one CRD withdraw line in any nine rod array is acceptable. A turbine missile (or spallation products) striking the HCU's would be expected to sever some lines; however, crimping is unlikely. Thus, it is believed that a hypothetical turbine missile would only affect a few, if any, of the control rods, and thus scram function would not be significantly impaired.

Secondly, even if a significant number of control rods failed to insert, the Standby Liquid Control System will be available as a backup for shutting down the nuclear reactor. As shown on FSAR figure 1.2-21, the Standby Liquid Control System is located southwest of the containment and thus is completely shielded from turbine missiles.



4  
3  
2  
1

CABLE TARGETS

Essential raceways are identified in the Fire Protection Review Report Revision 1, Appendix A. The assumptions and conditions of the fire review are sufficiently similar to the turbine review so that the results are applicable. The fire zones and the essential cable in each zone are:

<u>Elev.</u>	<u>Zone</u>	<u>Raceway</u>	<u>Layout DWG#</u>	<u>Target?</u>
719'	1-4A	E1K833	E-28-4 E-25-4	Yes None
749'	1-5A	E1KK21	E-25-5 E-28-5	No No
779'	1-6A	A1P075 A1P105 G1P107 E1P005	E-25-6 E-27-6	No No No No

The only essential raceway in the target zone for low trajectory missiles in the reactor building is on the 719' level - raceway E1K833 which controls Division I ESW pump control circuits.

The other raceways are located outside the low trajectory target area. This can be verified by inspection of the layout drawings provided earlier and referenced here.

### ELECTRICAL PENETRATION

There are nine electrical penetrations in the northern half of the primary containment above elevation 719', six of these are non-safety-related. The remaining three safety-related penetrations are all division II; i.e. no division I penetrations could be damaged by Unit 1 turbine low trajectory missiles. This agrees with the general plant separations arrangement. The majority of electrical and mechanical equipment located on the north side of the building is division II.



DIESEL POWER CABLE LAYOUT

Each diesel generator output cable leaves its cell below grade level and is separated from the other cables. The cables are routed underground to the east side of the reactor building where the run is embedded in concrete up to each switchgear room. These cables are not subject to damage from turbine missiles. A diagram is provided in figure 1 attached.



FIGURE 1

