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JOSEPH W. GALLAGHER
MANAGER
ELECTRIC PRODUCTION DEPARTMENT

October 5, 1979

Re: Docket Nos. 50-277
50-278

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
United States Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. Denton:

This is in response to your letter of September 17, 1979 regarding a potential unreviewed safety question on the interaction between non-safety grade systems and safety grade systems.

We have reviewed our non-safety grade systems to determine if there are any potential failures, caused by an adverse operating environment, that could impact safety analyses and the adequacy of protective functions.

Our review of these systems must be considered preliminary. Our approach to the concern is addressed in Appendix I, attached hereto and made a part hereof, including the status of our review to date. As stated in Appendix I, we are in the process of generating environmental profiles following the various high energy line breaks as part of our program to respond to Bulletin 79-01. We expect to have these environmental profiles available by November 1, 1979, and are therefore not able to determine mechanistic failure modes at this time. Our review began by assuming multiple, non-mechanistic failures and malfunctions of the non-safety grade systems and components. Based on these extremely conservative assumptions we identified three systems that warrant further investigation. The concerns with these systems are discussed in Appendix I.

We believe these three concerns do not warrant a change in the status of our license and that continued operation is justifiable while the final analysis proceeds. Our approach

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has been extremely conservative throughout and, therefore, we would expect the final concerns on these identified issues to be substantially less than what has been identified to date.

We have also initiated several other reviews that are associated with some of the issues raised by the Information Notice. These reviews include, but are not limited to, NUREG 0578, Bulletin 79-01, Post Accident Monitoring, Primary and Secondary Containment Isolations and several issues raised by an in-house TMI Lessons Learned Committee. As part of these reviews we will be able to further investigate the concerns raised by Information Notice 79-22 to ensure that the information and controls available to the operator will be more than adequate.

Very truly yours,

JW Gallagher

Attachment

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COMMONWEALTH OF PENNSYLVANIA :
ss.
COUNTY OF PHILADELPHIA :

J. W. Gallagher, being first duly sworn, deposes and says:

That he is Manager of the Electric Production Department of Philadelphia Electric Company; that he has read the foregoing response and knows the contents thereof; and that the statements and matters set forth therein are true and correct to the best of his knowledge, information and belief.

J W Gallagher

Subscribed and sworn to
before me this 5th day
of October, 1979

Elizabeth H. Boyer
Notary Public

Elizabeth H. Boyer
Notary Public, Phila. Phila. Co.
My Commission Expires Jan. 30, 1982.

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APPENDIX I

Description of Non-Safety Grade System Interaction Analysis Program

The analysis has proceeded in accordance with the outline shown in Attachment I. The identification of the various classes of high energy line breaks (Item 1 of Attachment I) has already been performed in FSAR Supplement No. 2 for PBAPS Units 2 and 3. The various breaks are listed in Table II. We are currently in the process of determining the detailed environmental profiles following the high energy line breaks for our response to IE Bulletin 79-01. This information is expected by November 1, 1979, so that any assessment of equipment malfunctions assumed to result from an adverse environment would only be preliminary at this time.

For the first step of the review of the non-safety systems, it was assumed that the effects of the high energy line breaks would be experienced inside primary containment, inside secondary containment, or within the turbine building. Based on the design of the reactor building HVAC system we assumed that the effects of the high energy line breaks would be transported throughout the lower elevations of the building. The refueling floor is served by a separate HVAC system so the immediate effects on the refueling floor would not be as severe as the effects on the lower floors.

Also, it was assumed that the entire turbine building would experience the effects of a high energy line break within the building since each turbine building is served by only one main ventilation system.

Based on these assumptions, we have reviewed all the plant systems to identify the non-safety grade systems that have controls or components located within primary or secondary containment or the turbine building, that could affect safety grade system performance, containment pressure capability or the potential for radiological releases (Item 2 on Attachment I). Table I gives a summary of our review of plant systems for Items 2 through 7 of Attachment I. The (X) in column 2, or any column, indicates that this system requires further review; the (F) in column 2 indicates that this system has no controls or components within the affected areas or has no effect on this item of concern. The (F) in any column indicates that the review for that system, for that concern, is finished.

The systems identified with an (X) under Item 2, Attachment I were then reviewed to determine if non-mechanistic failures or malfunctions on the component level could impact safety analyses and the adequacy of protective functions. Traditionally, non-safety systems were assumed to fail and not to interact with safety-grade systems. This review investigated the non-mechanistic failure(s) of system components and controls for

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effects their failures have on the system functional parameters (pressure-increase, decrease, no-change; flow-increase, decrease, no-change; temperature-increase, decrease, no-change) and for effects these parameter variations would have on ECCS performance, containment pressure capability, or radiological releases (these are Items 3 and 4 on Attachment I). An (F) in columns 3 and 4 on Table I indicates that the system has no effect on the areas of concern. Following Table I is a brief discussion of the potential concern for every (X) in column 3 and 4. This discussion includes 1) failures that are actually required to cause the concern, 2) a preliminary assessment of the probability of these failures being caused by a specific high energy line break and 3) means to mitigate the concern.

We are unable at this time to complete columns 5 through 7 of Table I because of the lack of the detailed environmental profiles following the high energy line breaks. However, we have made an assessment based on preliminary information. When the detailed profiles become available, more detailed analyses can be performed to determine if the assumed non-mechanistic failures can actually be caused by any of the high energy line breaks.

The last step in the analysis is an assessment of the magnitude of the actual detrimental effects caused by each class of high energy line breaks. This will examine the concerns identified in the previous steps and will include several or all failures associated with each class of break. If this assessment identifies a condition that could impact safety analyses and the adequacy of protective functions, modifications will be made to preclude the occurrence of the interaction or to mitigate its consequences.

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ATTACHMENT I

1. Identification of classes of breaks (Supplement No. 2 of PBAPS FSAR)

2. Identification of non-safety systems or components that could experience the environment caused by breaks identified in (1) which could affect safety systems, containment pressure response or radiological releases.

3. Determination if nonmechanistic failure of system components, postulated due to their non-qualification for LOCA environments, for those systems identified in (2) could affect safety systems or containment pressure response.

4. Determination if nonmechanistic failure of system components, postulated due to their non-qualification for LOCA environments, for those systems identified in (2) could result in radiological releases.

5. Analysis of systems or components identified in 3 or 4 to determine if the failures required can be caused by any of the breaks identified in 1.

6. Assessment of the approximate magnitude of the adverse consequences if failures can be caused by any of the breaks.

7. Elimination of any identified adverse consequences by:

   a) determination that consequences are bounded by existing analyses,

   b) modifications to preclude occurrence of the line break initiated failure, or

   c) modifications to mitigate the consequences of the line break initiated failure.

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TABLE I

	2	3	4	5	6	7
Startup transformer	F					
Raw Water Treatment	F					
Screen Wash	F					
Service Water	X	F	F			
Compressed air	X	X	F			
Make-up demins.	F					
Fire protection	X	F	F			
Fuel & Diesel Oil	F					
Startup Reg. Trans.	F					
Aux Boiler	F					
Cond & Demin-Storage & Trans	X	F	F			
Cond. Demins	X	F	X			
Inst. N2	X	F	F			
Cond. & Feedwater	X	F	F			
Extraction Steam & Drains	X	F	F			
Vacuum Pumps	X	F	F			
CRD Hydraulics	X	F	F			
CRD Manual	X	F	F			
250V DC EBOP	X	F	F			
Recirc. & MG Sets	X	F	F			
RWCU	X	F	F			

TABLE I

	2	3	4	5	6	7
Fuel Pool Cooling F/Demin	X	F	X			
Liquid Radwaste System & Collection	X	F	X			
SLC	X	F	F			
TBCW	F					
RBCW	X	F	F			
TB HVAC	X	F	F			
RB HVAC	X	F	F			
Offgas	X	F	F			
CACS	X	F	F			
Cont. Isolation	X	F	F			
Drywell Cooling	X	F	F			
Radwaste HVAC	X	F	F			
Circ. Water	F					
A. TIP	X	F	F			
B. Rod Worth Min.	X	F	F			
A. Process-area mon.	X	F	F			
B. Process-process mon.	X	F	F			
C. Process-environ. mon.	X	F	F			
Control room A/C	X	F	F			
Computer	X	F	F			
Offgas recombiner	X	F	F			
Offgas Recomb. HVAC	X	F	F			
Turb. & Aux	F					

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TABLE I

	2	3	4	5	6	7
Gland Steam System	X	F	F			
Main Turbine EHC	X	F	F			
Stator Cooling	F					
Excitation	F					
Main Generator	F					
N2 & H2 Systems	F					
Main Transformer & Iso. Bus Cooling	F					
Screen Structure	X	F	F			
Cooling Tower Sys.	F					
Evac. Alarm	X	F	F			
Reactor Head Vent	X	F	F			

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Fuel Pool Cooling & Filter/Demineralizers - It is hypothesized that non-mechanistic failures of the controls and instrumentation for the fuel pool cooling system could result in the loss of cooling for the fuel pool. The solutions to the loss of normal fuel pool cooling were all previously discussed in the FSAR, however, all of these fixes involve gaining access to secondary containment.

The possible mechanism for the failures could be from a high energy line break inside secondary containment. For these breaks, secondary containment would be accessible to provide a means of fuel pool cooling previously described in the FSAR. The only break that could make secondary containment inaccessible, due to radiation, would be the LOCA break. For this break the environment at the instruments would not be severe enough to cause component malfunction.

We will re-examine this position when the detailed environmental profiles are available, however, it does not appear to be a real concern at this time.

Compressed air system - A failure has been hypothesized that would cause the air dryer controls to malfunction while the compressors continued to operate. After a period of time the moisture content of the instrument air system would increase while system pressure was maintained. The only safety grade system that could possibly be interfaced with the moist air would be the CAD system purge and vent control valves. These control valves are equipped with compressed air bottles to provide control air if the instrument air system is unavailable. However, the bottles will not come into operation until normal air pressure is lost. Therefore these valves could experience this moist air.

We are currently investigating the effects that moist control air would have on these purge and vent control valves.

The two high energy line breaks that would be experienced primarily in the turbine building, where the compressed air supply system is located, are the main steam line and feedwater line breaks. The purge and vent controls for the CAD system are located in the reactor building which would be accessible in this situation and are not required to be operated for at least eighteen days following the Design Basis Accident. For these l[illegible]er breaks, the purging will not be required until beyond this period. During this period of time, moisture in the air system would have been detected in the non-essential plant systems and actions could be taken to correct the concern.

Such actions could be to fix the affected dryers, valve the other units compressed air system into operation to supply dry air to both units, or to remove the affected units compressed air system completely and allow the compressed air bottles to perform the CAD function.

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Liquid Radwaste & Collection System and Condensate Filter/Demineralizer - We presently do not have a good figure on the amount of reactor inventory that would be released to the liquid radwaste collection system following the various high energy line breaks outside primary containment. The amount of water could potentially overflow the tanks in the radwaste building leading to localized flooding.

It is also hypothesized that a failure of the condensate filter/demineralizer controls could cause a large amount of liquid to be transferred to the liquid radwaste system. If this failure were caused by a high energy line break in the turbine building, then both sources of liquid radwaste would have to be considered.

We have previously analyzed for overflow of the radwaste collection tanks into the water tight rooms of the radwaste building. We will analyze the various line breaks to determine the amounts of liquid under question for these breaks and will determine if modifications need to be made. This analysis will also determine if the controls for the condensate filter/demineralizers can be affected by a high energy line break in the turbine building.

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TABLE II

HIGH ENERGY LINE BREAKS

1) Main Steam Line
2) Feedwater Line
3) HPCI Steam Line
4) RCIC Steam Line
5) RWCU Line
6) Sampling and Instrument Lines

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