PHILADELPHIA ELECTRIC COMPANY

2301 MARKET STREET

P.O. BOX 8699

PHILADELPHIA, PA. 19101

(215) 841-5001

SHIELDS L. DALTROFF
VICE PRESIDENT
ELECTRIC PRODUCTION

June 13, 1984

Docket Nos. 50-277
50-278

Mr. John F. Stolz, Chief
Operating Reactors Branch No. 4
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

SUBJECT: Peach Bottom Units 2 and 3
I.E. Bulletin 79-01B, "Environmental Qualification of Safety-Related Electrical Equipment"

REFERENCE: Letter, J. F. Stolz, NRC, to E. G. Bauer, Jr., PECo, dated May 14, 1984, "Equipment Qualification of Equipment Important to Safety-Request for Additional Information

Dear Mr. Stolz:

Your letter of May 14, 1984, requested additional information pertaining to Equipment Qualification of Equipment Important to Safety. The enclosure to your letter detailed specific items that had to be addressed in our response to your request.

The attachments to this letter specifically address each of the items requested by the NRC in their enclosure to the above referenced letter, 'Request for Additional Information Equipment Qualification of Equipment Important to Safety', and include a justification for continued operation for Peach Bottom Units 2 and 3.

A045
1/1

A description of each of the attachments included as part of this letter is as follows:

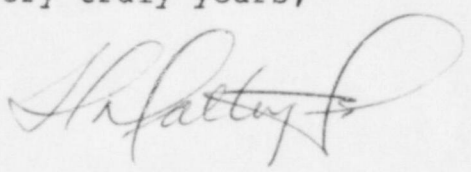
(1) Attachment 1, "Responses to Request for Additional Information Environmental Qualification of Equipment Important to Safety", restates each of items requested followed by our responses.

(2) Attachment 2, "Justification for Continued Operation", identifies the Equipment, Safety Function, Qualification Deficiency and Deficiency Evaluation for all outstanding justifications for continued operation pertaining to Environmental Qualification of Equipment Important to Safety.

Philadelphia Electric Company, with the submission of this response, has docketed the outstanding justifications for continued operation pertaining to Peach Bottom Atomic Power Station Units 2 and 3.

Should you have any other questions or require additional information, please do not hesitate to contact us.

Very truly yours,



Attachments

cc: A. R. Blough, Site Inspector

ATTACHMENT 1

PHILADELPHIA ELECTRIC COMPANY

PEACH BOTTOM ATOMIC POWER STATION

UNITS 2 AND 3

DOCKET NOS. 50-277 AND 50-278

RESPONSES TO REQUEST FOR ADDITIONAL INFORMATION - ENVIRONMENTAL QUALIFICATION OF EQUIPMENT IMPORTANT TO SAFETY

PHILADELPHIA ELECTRIC COMPANY
PEACH BOTTOM ATOMIC POWER STATION
UNITS 2 & 3
DOCKETS 50-277 & 50-278

Attachment 1

Ref: 1. Letter from S. L. Daltroff to J. F. Stolz dated 2/21/84
2. Letter from S. L. Daltroff to D. G. Eisenhut dated 1/16/84

Request

Submit all applicable JCO's that are currently being relied upon and certify the following for each JCO associated with equipment that is assumed to fail:

No significant degradation of any safety function or misleading information to the operator as a result of failure of equipment under the accident environment resulting from a design basis event will occur.

Response

Attachment 2 identifies the Justifications for Continued Operation (JCO's) which are being relied upon. There will be no significant degradation of safety functions and/or misleading information to the operator as a result of a failure of the equipment for which a JCO exists.

A. The license should certify that in performing its review of the methodology to identify equipment within the scope of 10 CFR 50.49(b)(2) that the following steps have been addressed:

Request A1.

A list was generated of safety-related electric equipment as defined in paragraph (b)(1) of 10 CFR 50.49 required to remain functional during or following design-basis Loss of Coolant Accident (LOCA) or High Energy Line Break (HELB) Accidents. The LOCA/HELB accidents are the only design-basis accidents which result in significantly adverse environments to electrical equipment which is required for safe shutdown or accident mitigation. The list was based on reviews of the Final Safety Analysis Report (FSAR), Technical Specifications, Emergency Operating Procedures, Piping and Instrumentation Diagrams (P&IDs), and electrical distribution diagrams;

Response A1.

The FSAR is the basis for determining the systems required to mitigate the effects of the postulated LOCA and HELB accidents. The LOCA and HELB accidents provide the limiting environmental conditions to which safety related equipment would be exposed. The Q-list, Electrical Schematic Drawings, Emergency Operating Procedures and Piping and Instrument Diagrams (P&ID) were reviewed concurrently to determine the role of individual electrical components in supporting the operation of

systems identified from the FSAR. Although a review of the Technical Specifications was not conducted, the Q-list contains all the equipment that appears in the Technical Specifications, and therefore the equipment within the Technical Specifications has been implicitly included.

Request A2.

The elementary wiring diagrams of the safety-related electrical equipment identified in Step 1 were reviewed to identify any auxiliary devices electrically connected directly into the control or power circuitry of the safety-related equipment (e.g., automatic trips) whose failure due to postulated environmental conditions could prevent required operation of the safety-related equipment and;

Response A2.

GE elementary wiring diagrams and Bechtel electrical schematics were reviewed to identify any auxiliary devices electrically connected into the control or power circuitry of safety related equipment. If it was determined that 1) the failure of the component could prevent the system from performing its safety function and 2) the component was located in a potentially harsh environment, the component was included in the I.E. Bulletin 79-01B equipment list.

Request A3.

The operation of the safety-related systems and equipment were reviewed to identify any directly mechanically connected auxiliary systems with electrical components which are necessary for the required operation of the safety-related equipment (e.g., cooling water or lubricating systems). This involved the review of P&IDs, component technical manuals, and/or systems descriptions in the FSAR.

Response A3.

In reviewing the environmental qualification documentation for Class 1E equipment, the function of the equipment was reviewed via P&ID's, component technical manuals, and/or systems in the FSAR. Any directly connected mechanical auxiliary systems to electrical equipment which are necessary for the safety related electrical equipment to perform its safety function were considered in the qualification of the Class 1E equipment.

Request A4.

Nonsafety-related electrical circuits indirectly associated with the electrical equipment identified in Step 1 by common power supply or physical proximity were considered by a review of the electrical design including the use of applicable industry standards (e.g., IEEE, NEMA, ANSI, UL, and NEC) and the use of properly coordinated protective relays, circuit breakers, and fuses for electrical fault protection.

Response A4.

The use of properly coordinated protective relays, circuit breakers, and fuses for electrical fault protection or physical separation has been verified for PBAPS nonsafety related electrical curcuits.

Request B.

Provide certification that all design basis events which could potentially result in a harsh environment, including flooding outside containment, were addressed in identifying safety-related electrical equipment within the scope of 10 CFR 50.49 (b)(1).

Response B.

As described in reference 1, flooding and environmental effects resulting from all postulated design-basis accidents documented in chapter 14 of the PBAPS Final Safety Analysis Report (FSAR), including Loss-of-Coolant and Steam Line Break Accidents (SLBA) inside primary containment, were considered. The flooding and environmental effects resulting from High Energy Line Breaks (HELBs) in secondary containment, as documented in Appendix A of the FSAR were also considered in the identification and qualification of this equipment. Therefore, all design basis events at PBAPS were considered within the scope of Paragraph (b) (1) of 10CFR50.49.

Request C.

Certify that the electrical equipment within the scope of 10 CFR 50.49(b)(3) is all R. G. 1.97 Catagory 1 and 2 equipment or that justification has been provided for any such equipment not included in the environmental qualification program.

Response C.

Electrical Equipment within the scope of 10 CFR 50.49 (b)(3) was addressed in reference 2. Justifications have been provided for any such equipment not included in the environmental qualification program and a schedule has been provided for replacement of non-qualified equipment with qualified equipment.

WJC:nel-p
nel-p053084m1035

ATTACHMENT 2

PHILADELPHIA ELECTRIC COMPANY

PEACH BOTTOM ATOMIC POWER STATION

UNITS 2 AND 3

DOCKET NOS. 50-277 AND 50-278

JUSTIFICATION FOR CONTINUED OPERATION

PHILADELPHIA ELECTRIC COMPANY
PEACH BOTTOM ATOMIC POWER STATION
UNITS 2 & 3
DOCKET 50-277 & 50-278

Attachment 2

Justification for Continued Operation

Equipment:	0AV20, 0BV20, 0CV20
Safety Function:	Drive standby gas treatment system motors, 101 days post-LOCA.
Qualification Deficiency:	Lack of motor material traceability by manufacturer.
Deficiency Evaluation:	System design uses two 100% capacity redundant filter trains with capability of using a third motor/fan for either train. Post LOCA accident environment can be considered mild except radiation dose from SGTS filters. Based on BLP-21544, the 40 year normal and post LOCA total integrated fan dose is 4.33×10^6 rads. Due to the physical layout, the third (standby motor) dose is expected to be less than 4.33×10^6 rads. Based on the above and in consideration of the typical materials used for motor construction, the likelihood of a motor failure due to he common mode post LOCA radiation exposure is insignificant.
Equipment	MO-10-13A,B,C,D) 10-154A,B) Group 1 14-11A,B) 23-20 MO-10-34A,B) Group 2 14-26A,B) MO-10-25A,B) Group 3 14-12A,B) 23-19
Safety Function:	Group 1 - passive essential Group 2 - normally closed and passive essential unless a surveillance test is in-progress coincident with a LOCA. Group 3 - essential active

Qualification Deficiency:	Lack of material traceability for drive motor brakes only.
Deficiency Evaluation:	A review of operability requirements for the Group 1 and 2 valves reveals that they are normally in their required position for safety system function and would not be required to change position for response to a safety system initiation signal. The Group 3 valves are normally closed and would be required to open post LOCA; however, they are located outside primary containment, and based on a 3 hour time lag between inside and outside containment, they would experience no adverse temperature or humidity during the period in which their operation might be required. The 10-25A,B valves would be required to open post-HELB however both valves would not be subjected to the immediate effects of the same HELB and therefore the potential for common mode failure of these valves does not exist. Furthermore, discussions with the manufacturer indicate that typical actuator drive motor stall torque is approximately 4 times greater than the static brake torque capability; therefore, it can be concluded and demonstrated by field experience that the motor can position the actuator regardless of brake failure.
Equipment:	MO-23-25
Safety Function:	Passive essential - normally closed test return to torus. Required for 15 minutes post LOCA.
Qualification Deficiency:	Motor lead material not suitable for radiation exposure.
Deficiency Evaluation:	Valve is normally in its required position for safety system function and would not be required to change position for response to initiation signal. Post LOCA radiation exposure during period of interest would not be significant since water source is the condensate storage tank.

Equipment:	SV-2671A,B,C,D,E,F,G SV-2678A,B,C,D,E,F,G SV-2980
Safety Function:	Isolation of containment atmospheric control system post accident.
Qualification Deficiency:	Material traceability and qualification documentation.
Deficiency Evaluation:	Valves are required for isolation only. They are normally open with coils energized. A coil insulation failure will result in the valve changing to its required post accident position.
Equipment:	LS-23-91A,B
Safety Function:	Automatically transfers HPCI suction from CST to torus on high torus water level.
Qualification Deficiency:	Radiation qualification test.
Deficiency Evaluation:	The radiation dosage level is below the threshold value for most materials; the probability of a failure caused by radiation is insignificant.
Equipment:	N3692,N3693,N3772,N3773,N3783,N3784, N3884,N3885,N3994,N3995
Safety Function:	Maintain area coolers control circuit continuity post accident - time required is consistent with associated ECCS system performance requirements.
Qualification Deficiency:	Test documentation radiation level too low.
Deficiency Evaluation:	A temporary modification has been completed to ensure that the control stations will not fail in such a way as to disable the area coolers. The contacts required for operation of the switch under post LOCA conditions will not render the area coolers inoperable. Also, the contacts which are used to manually initiate operation of the HPCI, RCIC and Core Spray area coolers for surveillance testing during normal plant operation have been removed to avoid the possibility of the operation of all

coolers in the event of a switch failure. Operation of all area coolers cannot be supported by the ESW System. This temporary rewire guarantees that the area coolers will operate as required post LOCA.

Equipment: DPS-00014,00015,20400-03,04,05,06,07,08, 09,10,11,12,13,14,15,16,17,18,19,20

Safety Function: Maintain electrical continuity for area cooler control circuit post accident, passive essential.

Qualification Deficiency: No qualification documentation for this equipment has been located.

Deficiency Evaluation: Dwyer Differential Pressure Switches (DPS's) have been environmentally tested by Franklin Research Center for PECO. The switches functioned successfully through baseline functional testing, thermal aging, radiation aging, seismic testing and for 4.5 days into the DBA similation which represents a postulated post DBA period of 13.5 days. The test switches were thermally aged for periods of 20 years and 40 years before DBA testing which adds to the margin of the DPS's installed at PBAPS which are only 10 years old. The DPS failure was such that the pressure actuated diaphragm became increasingly stiff during the test and eventually would not move when pressurized to open the micro switch within the DPS. No electrical insulation failure or structural failure occurred which would affect the operation of safety-related equipment for the entire 31 days of the DBA simulation. The DPS are used to control the operation of area coolers in RHR rooms. The failure of the DPS such that it will not change state does not affect the operation of the running area cooler. These switches are installed in the discharge side of the area cooler fans which would reduce their operating temperature by 10°F and in addition a 10°F margin was added to the general area postulated DBA temperature resulting in a DBA test temperature margin of +20°F. Failure of the DPS could affect

the capability of the backup area cooler from automatically initiating on the loss of the running cooler.

The RHR system (LPCI Mode) has four pump/motors located in four different rooms with two area coolers/RHR room. The failure mode of the DPS is such that it will not change state after 13.5 days post DBA and initiate operation of the backup area cooler for the RHR pump/motor. The existence of the backup area coolers is not required to meet system requirements or the single failure criteria; as redundant RHR equipment can meet the cooling requirements resulting from a DBA.

Based on the results of the FRC test, the RHR area coolers will start at the onset of an accident and cycle between the lead fan and backup fan (if required due to loss of lead fan) for 13.5 days. Ten minutes after the start of the DBA only two RHR pumps are required to effect an emergency shutdown, (ref. Table 8.5.2a PBAPS FSAR). If the DPS's failed 13.5 days after the beginning of a LOCA and the backup area cooler did not start, an increase in room temperature would be indicated in the control room and the operator would take appropriate action to start the redundant equipment in one of the other 3 RHR rooms. Operation of the RHR pump/motor initiates operation of the area coolers with the DPS in the closed position. The DPS is normally in the closed position during system shutdown and does not have to change state to initiate operation of the area coolers, therefore, it will perform its safety function.

Based on the failure mode of the DPS, the fact that the DPS does not have to change state to initiate operation of the area coolers and the RHR pump/motors are redundant, PECO concludes that PBAPS can continue to operate without undue risk to public health and safety.

Equipment: PT-6-105

Safety Function:	Provides reactor pressure indication for operator information.
Qualification Deficiency:	No qualification documentation can be located for the instruments.
Deficiency Evaluation:	Pressure Transmitter PT-6-105 is located in room 403 and provides reactor pressure indication for operator information. PT-2-3-55A,B,C,D, are also located in room 403, provide indication for operator information and are environmentally qualified. PT-6-105 will be replaced to enhance the present level of qualification. The new pressure transmitter will have a post accident operability time of one year as opposed to a 7-hour post accident operability time for the redundant instruments PT-2-3-55A,B,C,D. Pressure Transmitters PT-2-3-55A,B,C,D are qualified to temperature, pressure and radiation levels in excess of the postulated DBA conditions. Based on the foregoing, it can be concluded that information will be available for the operator to take the proper action as required by the emergency procedures.
Equipment:	TE-2442A,B
Safety Function:	Provide suppression pool water temperature indication for operator information.
Qualification Deficiency:	No qualification documentation can be located for this instrument.
Deficiency Evaluation:	Temperature Elements TE-2442A,B located in the torus provide suppression pool water temperature indication for operator information. The only non-metallic materials in the temperature elements, as documented by a telephone conversation with Decher Instrument Company, are the neoprene connection head cover gasket and the ceramic terminal block in the connection head. Based on a review of these materials as listed in EPRI-NP-2129 Report and Standard Handbook for Electrical Engineers, it is concluded that neoprene and ceramics can withstand radiation levels in excess of 1 MR and are not adversely affected by the

postulated high temperature operation. Based on the foregoing, it can be concluded that information will be available for the operator to take proper action as required by the emergency procedures.

WJC:LCY
5/14/84
LY51484M825