DEC 15 1978

Docket No. 50-311

-	Di <u>s</u> tribution <i>w</i> /enclosure				
•	Docket File		D. Ro	SS	
	NRC PDR		J. Kn	ight	
	Local PDR		R. Te	desco	,
	LWR #3 File		R. De	Young	
BEC TO HU	R. Boyd		V. Mo	ore	
	D. Vassallo		R. Vo	llmer	
-	F. Williams		M. Er	nst	
ket No. 50-311	A. Dromerick		R. De	nise	
- -	M. Rushbrook	(w/extra	copie	s)	
,. · · · ·	- ELD		IE (3)	
Mr. R. L. Mittl, General Manager	🐯 O. Parr			-	
Licensing and Environment		•			
Engineering and Construction Department		• , •	BCC:	NSIC	
Public Service Electric and Gas Company				TIC	
80 Park Place				ACRS	(16)
Newarks New Jersey 07101					-

Dear Mr. Mittl:

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE SALEM UNIT 2 FINAL SAFETY ANALYSIS REPORT (FSAR)

As a result of our continuing review of the Salem Fire Protection Program, we have established staff positions in order for the Salem facility to meet our current fire protection criteria. The specific positions are presented in draft form and are addressed in the Enclosure. These positions do not include our Power Systems Branch inputs regarding your fire protection program, which we expect to transmit to you at a later date.

We require that you clearly state your intent regarding the positions addressed in the Enclosure.

In order to maintain our review schedule, your response to our positions is required promptly. Please contact us if you desire any discussions or clarification of the enclosed request.

Sincerely.

Original Signed by O. D. Parr

Olan D. Parr, Chief Light Water Reactors Branch No. 3 Division of Project Management

Enc	losure:	
As	stated	

OFFICE

URNAME 🗟

ccs:#/enclosure: 7812290027 See next page

OParr

)rømerick:c

Mr. R. L. Mittl

cc: Richard Fryling, Jr., Esq. Assistant General Counsel Public Service Electric & Gas Company 80 Park Place Newark, New Jersey 07100

> Mark Wetterhahn, Esq. Conner, Moore & Cober 1747 Pennsylvania Avenue, N.W. Suite 1050 Washington, D.C. 20006

Mr. Leif J. Norrholm U. S. Nuclear Regulatory Commission Region I Drawer I Hancocks Bridge, New Jersey 08038

4



Auxiliary Systems Branch Fire Protection Positions Salem Nuclear Generating Station, Units 1 & 2 Docket Nos. 50-272 and 50-311

- 1. You state in your response to Question 1(a) that the call-up of personnel is not necessary since off-site local fire company teams are available. It is our position that five men will be available for the fire brigade (in accordance with Manpower Requirements for Operating Reactors attached). Also we will require written procedures be established if local fire comparies are used, including equipment and men responding, access to plant, time to respond, etc. We will also require that Regulatory Guide 1.101, "Emergency Planning for Nuclear Power Plants," be used as applicable as well as NFPA 27, "Private Fire Brigade," be followed for organization, training and fire drills.
- 2. Your response to Questions 1(b) and 5(b) are unacceptable. It is our position that portable radios be provided incorporating repeaters as necessary for the fire brigade and operations personnel required to achieve safe shutdown. Preoperational and periodic-testing should demonstrate that the frequences used for portable radio communication will not affect the actuation of protective relays.

3. Your response to Question 2 is unacceptable. Our positions for each part of Question 2 are as follows:

RAF7

-2-

You responded by saying that all doors to safety-related (1)areas are certified by the manufacturer; however, the exact hourly rating of all these doors have not been given. You also state that the rating on the doors exceed the area fire rating as determined by the fire hazards analysis, assumed by your response and your fire hazards analysis that although the rea fire ratings FOR THREE are one hour or less. 🐲 verify that all fire doors used to pro-HOURS, THE Doors tect openings in walls containing safety-related equipment and/or ART RATED conduit cable have a fire rating of 3 hours or provide 3 hour For 3/4-ONE HOUR 510 05 rated doors.

(2) Provide a drawing showing how each cable tray is supported by steel welded to penetration frame of the opening. Verify that this type of arrangement, in which the aluminum cable tray melts, has been tested for 3 hr. fire resistance with no effect on the integrity of the seal.

(3) It is our position that fire stops be installed between levels or in vertical cable chases. Fire stops should be installed at the midheight of the vertical run if 20 ft. or more but less than 30 ft., or at 15 ft. intervals in vertical runs of 30 ft. or more. Individual fire stop designs should prevent the propagation of a fire for a minimum period of 30 min. when tested for the largest number of cable routings and maximum cable density.

ŝ,

RAFI

(4) and 2b. You state that fire damper/doors are not required at Salem because the area fire rating determined by the fire hazards analysis does not exceed 1 hr. This is unacceptable. It is our position that where ventilation ducts penetrate 3 hr. fire rated construction that 3 hr. fire dampers be provided. Since the majority of the ventilation penetrations do not have fire dampers/ doors through the plant, the unprotected ventilation penertrations, plus the unknown fire rating of the doors and penetrations can reduce the fire rating for a given area to an unknown level.

c. You have not responded to our concern that the equipment hatches of any room in fire areas containing safety related equipment have a 3 hr. fire rating as tested under ASTM E-119. It is our position that the hatches have a 3-hour fire rating.

4. Your response to Question 3 is unsatisfactory. It is our position You ESTABLISH that administrative controls that follow staff supplemental guidance in our memo of June 14, 1977, "Nuclear Plant Fire Protection Function Responsibilities Administrative Controls and Quality Assurance" NGAR to prohibit any storage of combustible material new safety-related conduit/cable or equipment at any time.

. You need sprinklers and barriers or alternate shutdown.....

5. Your response to Question 4 is inadequate. It is our position that the thermal and acoustical glass fiber insulation manufacturered by Ownes Corning and the Cellic mineral tiles manufacturered by Armstrong have:

1. a potential heat release of 3500 Btu/1b or less when tested under ASTM D-3286 or NFPA 259, and

2. a flamespread rating of 50 or less when tested under ASTM E-84. Verify that these materials meet this position or replace it with acceptable material.

- 6. Your response to Question 5a is unacceptable. It is our position that fixed 8 hr. capacity self-contained emergency lighting of the fluorescent or sealed beam type in areas that must be manned for safe shutdown and for access and egress routes to and from all guerose such areas be provided. Also 2 hour emergenncy lighting for other plant access and egress routes.
- 7. Your response to question 7 is unsatisfactory. It is our position that sufficient hose stations be provided so that all portions of the below listed areas can be protected by stations having a maximum of 100 ft. of hose.



- 2. Upper electrical penetration area elevation 100 ft.
- 3. Emergency diesel day tank room.

Portable fire extinguishers are of limited value due to their short duration and limited capacity. The intent of Appendix A guidelines that "Hose stations should be located outside entrances to normally unoccupied areas" was for small areas where the hose station may be blocked by the fire. For large areas, hose stations may be located in unoccupied areas and offer better protection since fire barrier doors do not have to breached to drag the fire hose through and in which the door cannot close.

The use of an outside hydrant for backup fire suppression for the Service Water Pump House is satisfactory provided a hose house is provided over the hydrant and the 1 1/2 in. hose is preconnected to a hydrant outlet. Also sufficient hose should also be provided to enable a second hose stream from the hydrant.

-5-



(1) 460U. switchgear room, elevation 84 ft.

DRAFT

ς.

(2) 416U. switchgear room, elevation 64 ft.

(3) Electrical penetration area, elevation 78 ft.

Each of the above rooms contains redundant safety related conduitcable within 20 feet of each other. It is our position that the design be modified to an automatic CO_2 system. It is also our position where redundant equipment as well as conduit cable necessary for safe shutdown are within 20 ft. of each other, that each train be protected by a half hour fire rated barrier, and automatic sprinklers be provided to protect against an exposure fire or that an alternate method of achieving safe plant shutdown in accordance with the attached staff requirements be established which is independent of the equipment in the fire area.

11. Your response to 10.a(1) is unacceptable. Both RHR pumps and associated equipment are located on elevation 45 ft. in separate rooms; however, these rooms are interconnected on elevation 55 ft. by ventilation ducts, ladder access to the 45 ft. elevation and equipment hatches. The rooms are not separated from each other by 3 hr. fire rated construction. Also a fire on the lowest elevation would be extremely difficult to reach since access is only be a ladder.

-6-

It is our position that a wet pipe automatic sprinkler system be provided on both elevations of both redundant trains, and as a minimum a half hour fire barrier should be installed to separate the equipment from its counterpart including conduit and cable.

12. Your response to question 10.a(2) is unacceptable.

DRAFT

- a. The three charging pumps are separated by a concrete wall; however, a corridor is common to all three pumps. An exposure fire can still damage redundant conduit/cable and equipment in the area. Although you state you will install a 3 hr. wall separating each pump, a flammable liquid spill fire can still damage redundant equipment. It is our position that curbs should be provided to prevent such an occurrence from happening, as a minimum a half hour fire barrier should be installed to separate the equipment from its counterparts including conduit and cable and since the pumps are in a common room, install automatic sprinklers over the pumps.
- b. The two motor driven auxiliary feedwater pumps are separated from the steam driven feedwater pump by a noncombustible barrier; however, a common corridor provides communication between the steam and electric pumps. An exposure fire can still damage redundant pieces of equipment.

-7-



It is our position that you provide a half hour fire barrier to separate each piece of equipment from its counterpart including conduit and cable as well as automatic sprinklers.

- 13. a. If redundant equipment located in the upper electrical penetration area are needed for safe shutdown of the plant and/or the habitability of the control room complex, automatic sprinklers should be installed in addition to the rated fire barriers between the pieces of equipment. Conduit and/or cable in this area should also be protected.
 - c. You state that neither 3 hr. barrier or automatic sprinklers will be provided for protection of the boric acid mixing and storage tank areas since spirnkler water would cause solidification of the boric solution. It is our position that area wet pipe automatic sprinklers be provided for protection against a possible exposure fire in this area.
- 14. Your response to question lla is inadequate. Steel floor plants between the control and control equipment rooms, and the relay room below are protected with silicone foam. It is our position than an <u>approved</u> fire rated barrier separate the control room from the relay room below.

-8-

- 15. Your response to Question 11b. is unsatisfactory. It is our position that all peripheral rooms within the control room complex (within the 3 hr. fire rated walls) be provided with automatic smoke detection as well as the walls and doors of these rooms be fire rated for 1 hr. (the walls should extend to the underside of the floor above). Plain glass in walls or doors is not an acceptable arrangement.
- 16. Your response to Question llc. is unsatisfactory. Since an exposure fire can involve both redundant divisions in the control equipment rooms, it is our position that automatic Halon or carbon dioxide be provided to totally flood the room. This room is cut-off by non-rated barriers from the main control room.
- 17. Your response to Question 12a. is inadequate. It is not clear how fire water used in the relay room can be directed to flow from the relay room to 2-4" floor drains in the 250 volt battery room or to the stairway at the east end of the corridor and down to the floor drains in the 4160U switchgear room of Unit #2. Provide a more detailed description of hos this can be accomplished.
- 18. Your response to Question 12f. is inadequate. Provide your implementation plans on when the automatic gas system will be installed in the relay room.

-9-

DRAPT



19. Your response to questions 12g. and 15b are totally unsatisfactory. It is our position that 3 hr. automatic fire door/dampers be provided in all ventilation ducts that penetrate the floors, walls and ceiling of the relay room and switchgear rooms. The fire area surrounding these rooms are required to have a 3 hr fire rating including protection of all openings including all ventilation openings.

The fire hazard analysis on these rooms did not consider that the fire may be on the other side of the wall and this exposes the safety-related equipment and conduit/cable within the room itself.

- 20. The applicant's response in Question 13 that with 150 ft. of hose he can reach both battery rooms is unsatisfactory. It is our position that an additional hose station consisting of 100 ft of hose and suitable nozzle be provided for the battery rooms 1A and 1B.
- 21. Your response to Question 14 is unsatisfactory. You state that neither fire damper/door will be provided for the ventilation penetrations rated fire barrier nor the manual CO_2 system for this room be modified for automatic operation. It is our position stated in Questions 3a(4), 3b and 8 that fire damper/door and an automatic CO_2 system be provided.

-10-



- 23. Your response to Question 16c is unsatisfactory. It is our position that additional information is needed including a description of the fire barrier as well as the protection to be provided for redundant conduit/cable in the reactor plant auxiliary equipment areas.
- 24. Your response to Question 16d is unsatisfactory. You have not addressed the problem of an exposure fire and its involvement with the safety-related equipment in the immediate area of the auxiliary feed pumps. Vapors from the stored hydr2gene form explosive mixtures with air over a wide range. It is our position that this material be relocated to another location that does not contain safety-related equipment or cable/conduit.

-11-

DRAFT



- 26. You responded in question 16f by saying that the hydrogen supply lines to the volume control tank will be rerouted away from safety related equipment, conduit or cable to the maximum extent possible. It is still our position that they hydrogen lines be totally rerouted, and an implementation schedule provided.
- 27. Your response to Question 16g is unsatisfactory. During the site visit transient combustible material was noted that exposes safety-related cable of both trains at the west end of the auxiliary equipment area, elevation 122 ft. It is our position that you provide automatic spinklers for this area to protect the safety related systems and a 1/2 hr. fire rated barrier be provided around the safety related cable trays in the area where an exposure could involve more than one channel. As stated in Appendix A, Section 0.1(j), it is our position that 3 hr. fire door/dampers be provided for the ventilation ducts that penetrate the fire boundary of this area or provide alternate method of shutdown that is independent of this area.

-12-

JZAFT



- 28. Your response to question 18a is unsatisfactory since it states that fire door/dampers will not be provided for the ventilation penetration for the following areas:
 - 1. Inlet air from the CO₂ equipment room.
 - 2. Fuel oil transfer pump room exhaust duct.
 - 3. Exhaust duct to outdoors.

It is our position that rated fire door/dampers be provided in the ventilation penetrations for the above areas.

- 29. Your response to question 18d is unsatisfactory. Total reliance is being placed on the automatic actuated flooding CO₂ system to properly extinghish a flammable liquid fire. If the primary suppression system fails, the 3 hr. fire barriers are void since the applicant refuses to install fire door/dampers at the ventilation penetrations of this room. Small hose lines are of limited value for a fire of this nature due to the limited quantity of water that they deliver. It is our position that a fixed automatic high expansion foam system be provided to properly protect the diesel oil tank rooms and properly installed rated fire door/dampers be PROVIDED
- 30. The response to Question 19a is unsatisfactory. If the boron injection tank is not kept at operating conditions then this equipment may not be available as needed to bring the plant to a safe cold shutdown. As stated in Appendix A, Section D.1(a)(1) it is our

-13-



31. The response to Question 19b is unacceptable. It states that as a result of the fire hazards analysis, the potential fire duration is negligible and states that Section 7, Chapter 4 of the NFPA Fire Protection Handbook does not require fire dampers for barriers rated 1 hr or less.

Fire barriers for these areas are required to be 3 hr. fire rated construction and are needed to properly protect the ventilation penetrations. It is our position that automatic 3 hr. fire door/ dampers be provided for all ventilation ducts that penetrate the fire rated barriers of the radwaste area (designated Drumming and Bailing Area) to separate that area from other safety real,ted areas.

32. You have not addressed the overhead cabling problem in your response to Question 21. You have stated you will install a 3 hr. fire rated barrier to separate redundant motor control centers. It is our position that a half hour fire barrier be installed between redundant equipment as well as automatic sprinklers.

~14-

DRAFT



- 33. In Question 23 you state that two ionization detectors will be added in the piping penetration area, elevation 78 ft. It appears from the scaled drawing that two detectors will greatly exceed the listed spacing requirements of the detector. Verify that square foot area covered per detector is within the listed spacing requirement of the detector or install additional detectors.
- 34. There is insufficient information in the response to Question 24b on the fire protection provided for each reactor coolant pump to complete our review. It is questionable if the present deluge system can properly protect each pump. Provide detailed drawings of your oil collection system showing that all exterior, pressurized oil piping is properly guarded and drained to a safe location, so that a proper evaluation of the fire proection system can be made.
- 35. The response to Question 25 is unsatisfactory. It is our position that automatic detection which alarms and annunciates in the control room be provided throughout the new fuel area as well as the spent fuel pool area.
- 36. The response to Question 27 is unsatisfactory. The applicant states that the cable at the end as well as throughout the tunnel area, is arranged such that separation between redundant safety related channels and Units 1 and 2 cables exceed IEEE-384 separation requirements.

-15-



It is our position that you provide an analysis to show that an exposure fire at any location in the tunnel area will not prevent either Unit from achieving safe cold shutdown.

-16-

- 37. Your response to Question 29 is unacceptable. It is our position for the back-draft type dampers installed between fire areas that either:
 - The back draft type damper has a fire rating equivalent to the fire barrier.
 - b. Or fire door/dampers be installed in addition to the back draft type dampers.

Staff Requirements

ine losu

- 1.0 Minimum safe shutdown systems when one division of all safety systems is not available.
- 1.1 Following any fire, the plant can be brought to hot shutdown conditions using equipment and systems that are free of fire damage.
- 1.2 The plant should be capable of maintaining hot shutdown conditions for an extended time period significantly longer than 72 hours.
- 1.3 Fire damage to systems necessary to achieve and maintain cold shutdown conditions should be limited so that repairs can be made and cold shutdown conditions achieved within 72 hours.
- 1.4 Repair procedures for cold shutdown systems should be prepared now and material needed for such repairs should be on the site.
- 1.5 The hot shutdown condition must be achievable with power from the offsite power system, and upon its loss, with power from the onsite power system. A dedicated power supply may be substituted for the onsite power system.
- 1.6 The power needed to achieve the cold shutdown condition may be obtained from any one of the offsite power, onsite power, and dedicated power system.
- 1.7 When these minimum systems are provided their adequacy shall be verified by a thorough evaluation of:
 - a. Systems required for hot shutdown;
 - b. Systems required for cold shutdown;
 - c. Fire damage to power distribution systems; and
 - d. Interactions caused by fire damage to power and water supply systems and to supporting systems, i.e., component cooling water supply.
- 2.0 Minimum fire protection when dedicated or alternate shutdown systems are provided.
- 2.1 The fire protection systems in areas (such as cable spreading rooms) that contain cables for a large number of systems should consist of:
 - a. Fire detection system;
 - b. Hose stations; and
 - c. Fixed manual suppression system (gas or water)
 - NOTE: Consideration to preventing fire propagation via covered trays, fire retardant coating, barriers or blankets on a case-by-case basis.

. .

2.2 Where access is difficult or impossible automatic systems should be provided.

1.

2.3 Where modifications will not be implemented for an extended period, interim protection measures should be required to compensate for the lack of protection.