PSE&G

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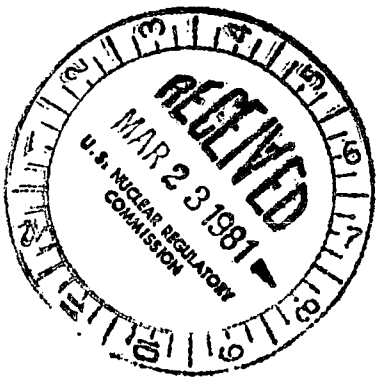
March 19, 1981



Director of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Attention: Mr. S. A. Varga, Chief
Operating Reactors Branch 1
Division of Licensing

Mr. Frank J. Miraglia, Chief
Licensing Branch 3
Division of Licensing

Gentlemen:

SALEM NUCLEAR GENERATING STATION
NO. 1 AND 2 UNITS
COMPLIANCE WITH 10CFR50 APPENDIX R
FIRE PROTECTION PROGRAM-BACKFIT ITEMS

The Nuclear Regulatory Commission issued Fire Protection Safety Evaluation Report for Salem Units 1 and 2 (FPSER) which states that the plant design features and modifications meet the guidelines contained in Appendix A to Branch Technical Position APCSB 9.5-1 on November 20, 1979. In accordance with Appendix R, only the three backfit items (III.G, III.J, and III.O) are applicable for Salem Unit 1. By letter dated December 1, 1980, PSE&G agreed that the modifications required for Unit 1 would be made on Unit 2 for the three backfit items. The following information for each item is provided as required by 10CFR50.48, Section (c)(5):

III.G Fire Protection of Safe Shutdown Capability

1. Paragraph III.G.1:

Fire protection features shall be provided for structures, systems, and components important to safe shutdown. These features shall be capable of limiting fire damage so that:

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a. One train of systems necessary to achieve and maintain hot shutdown conditions from either the control room or emergency control station(s) is free of fire damage, and

b. Systems necessary to achieve and maintain cold shutdown from either the control room or emergency control station(s) can be repaired within 72 hours.

Design Description:

Salem will achieve compliance with this requirement in accordance with our previous commitments in fire protection reviews with the Staff. The fire protection features will provide the necessary protection for one train of systems for hot shutdown and also for cold shutdown from the control room from fire damage in areas outside the control room and relay room. Alternate hot and cold shutdown capability will be provided for fires in the above noted rooms in accordance with G.3 requirements (as discussed later). The design features and alternate shutdown capability do not require repair of damaged cold shutdown systems in order to maintain plant safety. Any repairs that could be made would enhance existing capabilities.

Implementation Schedule:

Salem will be in compliance with this item as the design features described in G.2 and G.3 are completed. The scheduled completion dates are noted in the following sections:

2. Paragraph III.G.2.a, b, c:

Except as provided for Paragraph G.3 of this section, where cables or equipment, including associated non-safety circuits that could prevent operation or cause maloperation due to hot shorts, open circuits, or shorts to ground, or redundant trains of systems necessary to achieve and maintain hot shutdown conditions are located within the same fire area outside of primary containment, one of the following means of ensuring that one of the redundant trains is free of fire damage shall be provided:

a. Separation of cables and equipment and associated non-safety circuits of redundant trains by a fire barrier having a three hour rating. Structural steel forming a part of or supporting such fire barriers shall be protected to provide fire resistance equivalent to that required of the barrier;

b. Separation of cables and equipment and associated non-safety circuits of redundant trains by a horizontal distance of more than 20 feet with no intervening combustible or fire hazards. In addition, fire detectors and an automatic fire suppression system shall be installed in the fire area; or

c. Enclosure of cable and equipment and associated non-safety circuits of one redundant train in a fire barrier having a one hour rating. In addition, fire detectors and an automatic fire suppression system shall be installed in the fire area.

Design Description:

The systems, equipment, and cables required for hot and cold shutdown were analyzed to assure that adequate separation (20 ft. clear air) within an area/room (except containment, relay room, and control room) is provided. Where this criterion was not met, one of the following was to be provided:

- 1/2 hour barrier and sprinklers
- 1 hour barrier and no suppression system for one train
- alternate shutdown capability (relay room will incorporate this)

In addition, all trains of the auxiliary feedwater system (AFW) were to be protected if separation criteria is not met. The design progressed using this guidance from the NRC Staff. The analysis has been completed with the equipment barriers installed and cable tray wrap installation in progress. The cable and equipment barriers are fire rated for one hour.

Walls separating different fire zones within the plant have ventilation ducts penetrating the barrier and doors forming a part of the barrier. As part of the fire protection program review, PSE&G committed to provide fire rated doors/dampers of at least 1-1/2 hour. Based on

fire loadings throughout the plant, the fire rated door/damper design has been approved by the NRC Staff. This modification has been completed on both units.

Associated circuits were considered in the analysis to the extent they were needed for the operation to be protected. Cables and equipment required for a particular function were factored into the fire separation analysis. Protection was provided for at least one redundant train. Other associated circuits from a common power source were not part of the wrapping program due to their isolation via circuit breakers, fuses, etc. These circuits are electrically protected from the required fire shutdown circuits by at least a breaker or fuse. The system is electrically coordinated and in compliance with the separation criteria established for Salem. PSE&G believes that this analysis and design adequately addresses associated circuits with respect to fire protection design.

The above discussion indicates that Salem meets the intent of the Appendix R requirements. However, the following exemptions are requested:

Exemption 1: Paragraph III.G.2a requires a three hour barrier for hot shutdown systems and cables, including structural steel forming a part of or supporting the barrier. As noted in the previous discussion, walls forming barriers between redundant equipment/cables may incorporate fire rated doors and dampers depending on the area. The doors/dampers are 1-1/2 hour fire rated. This fire protection design feature has been approved by the NRC Staff (see FPSER, page 14). PSE&G believes that this exemption is justified since the fire hazards analysis performed for Salem indicates that this is more than adequate for the fire loadings in the areas. In addition, the installation has been completed in accordance with previous NRC Staff approval. This design provides an acceptable alternative which meets the fire protection requirements of this paragraph.

Exemption 2: Paragraph III.G.2c requires a one hour barrier for protection of one train of hot shutdown systems and an automatic suppression system in fire area. As noted in the previous discussion, the Salem design protects hot and cold shutdown systems with one hour fire barriers and no automatic suppression. In some areas of the plant such as the electrical penetration area, 4160V, and 460V switchgear rooms a fixed manual actuated CO_2 system is installed in addition to the one hour barriers. Additional fire detectors have been installed in various other areas of the plant. This design feature has been approved by the NRC Staff (see FPSER, page 20). PSE&G believes that this exemption is justified on the basis of the fire hazards analysis which shows fire loadings of less than 1/2 hour. In addition, the materials have been purchased with installation in progress in accordance with previous NRC Staff approval of the design. The design provides an acceptable alternative to meet this requirement and exceeds this requirement by protecting cold shutdown systems and all trains of AFW.

Exemption 3: Paragraphs III.G.2a and 2c specify either barriers or barriers plus automatic suppression for redundant systems in a given fire area. In the Auxiliary Feedwater Pump Room, the design incorporates redundant, separately actuated automatic sprinkler systems. This was proposed due to the need for manual operation in the area. Barriers would be a hindrance and detrimental to safe operation. This design feature has been approved by the NRC Staff (see FPSER, page 35). PSE&G believes that this exemption is justified on the basis of the fire hazards analysis which shows this to be more than adequate for the fire loading in the area, and potential interference with required operations in the area. The design and

installation has been completed in accordance with previous NRC Staff approval. This design provides an acceptable alternative to meet this requirement.

Implementation Schedule:

The AFW automatic sprinkler system, the barriers between the switchgear groups, and manual fixed suppression systems have been installed. The cable tray wrap installation for Unit 1 should be completed by April 10, 1981, pending resolution of productivity problems. The installation for Unit 2 will be complete prior to full power operation. This delay is also due, in part, to the use of material recently accepted for use at Salem to resolve thermal considerations/current derating of enclosed cable trays. Ceramic/mineral fiber wrapping material will not be used on all cable trays. Cable tray wrap will include the use of material manufactured by 3M (FS-195) which also has a 1 hour fire rating. Installation design and technique has also been changing to facilitate future work on cable trays. Until this work is complete, exposure to a fire hazard with potential for cable/equipment damage will be minimal due to the essentially continuous occupation of the areas where cable tray wrapping is still in progress.

3. Paragraph III.G.2d, e, f:

Inside noninerted containments one of the fire protection means specified above or one of the following fire protection means shall be provided:

d. Separation of cables and equipment and associated non-safety circuits of redundant trains by a horizontal distance of more than 20 feet with no intervening combustibles or fire hazards,

e. Installation of fire detectors and an automatic fire suppression system in the fire area, or

f. Separation of cables and equipment and associated non-safety circuits of redundant trains by a noncombustible radiant energy shield.

Design Description:

Analysis of cables and equipment within the Containment was not required due to the small amount of combustibles in the area, restricted access to the area and the low probability of transient combustibles entering the area. Although not considered previously, PSE&G will examine redundant cables within the Containment and provide adequate protection as necessary. The protection will include installation of a non-combustible (fire rating not required) radiant energy shield, such as marinite board, in the electrical penetration area of the containment per discussions at the meeting with the NRC Staff on February 5, 1981.

Implementation Schedule:

PSE&G will perform the necessary analysis and implement the modifications required to be in compliance with this item. Implementation for Unit 1 will be conpleted prior to restart following the 1982 refueling outage. Implementation for Unit 2 will be completed prior to restart following the first refueling outage.

4. Paragraph III.G.3:

Alternative or dedicated shutdown capability and its associated circuits, independent of cables, systems or components in the area, room or zone under consideration, shall be provided:

a. Where the protection of systems whose function is required for hot shutdown does not satisfy the requirement of Paragraph G.2 of this section, or

b. Where redundant trains of systems required for hot shutdown located in the same fire area may be subject to damage from fire suppression activities or from the rupture or inadvertent operation of fire suppression systems.

In addition, fire detection and a fixed fire suppression system shall be installed in the area, room, or zone under consideration.

Design Description:

An alternate shutdown capability for fires which may damage equipment in the relay room is being installed as previously committed in the fire protection program. This capability will provide for hot and cold shutdown from outside the relay room and control room. It is not dependent on cables or equipment in those rooms or cables at the ceiling entering the relay room from the 460V switchgear rooms.

The alternate capability includes new instrumentation needed for maintaining plant stability at hot shutdown (hot standby per Tech Spec definition). This instrumentation will be totally separate from existing instrumentation and will include separate power supplies, signal conditioning equipment, indicators, etc., which are not located nor require equipment within the fire zone of interest to operate.

The instrumentation is for the primary system variables - pressurizer pressure, pressurizer level, steam generator level, and steam pressure. Operation of valves and pumps will be accomplished at local stations external to the fire zone of interest. Procedures will be provided to describe the actions to be taken by operating personnel for local operation. These procedures will also alert personnel as to the actions necessary to prevent misoperation of the devices from associated circuits and equipment located within the fire zone. Individual system status monitoring will be done via local instruments. Some indications would have to be modified for cold shutdown (procedures will provide appropriate instructions), but sufficient time is available while the plant is maintained at hot stable conditions.

Hot shutdown would be accomplished by personnel stationed at various locations - auxiliary feedwater pump area, charging pumps, 4160V switchgear rooms and steam penetration areas. Roving personnel would perform one-time manipulations of selected valves at motor control centers, instrument panels or at the valves. Sufficient time exists for these operations to accomplish hot shut-shutdown. Additional personnel could be needed for cold shutdown, but this would be at a later time following the fire incident.

Repairs within the fire zone are not required. Procedures will direct personnel actions to achieve cold shutdown external to the fire zone. Any repairs which could be made to allow control room operations or additional equipment operability would enhance shutdown capabilities. These decisions would be made by operating/technical personnel following an assessment of fire damage. PSE&G believes this alternate shutdown capability meets the requirements of this paragraph.

In addition to the alternate shutdown capability, Salem has an automatic actuated Halon suppression system for the relay room and a fixed manual actuated CO_2 system for the 460V switchgear room. This is in compliance with the requirement for fixed suppression systems in the fire area of interest for which alternate shutdown capability will be provided. The Control Room area does not have a fixed fire suppression system since it is continuously manned. Portable fire fighting equipment and fire detectors have been provided. This has been previously approved by the Staff as part of the fire protection program. Therefore, we request an exemption for the Control Room as stated below:

Exemption 4: Paragraph III.G.3 requires that a fire zone for which an alternate shutdown capability was designed must have a fixed fire suppression system and fire detectors. The control room area has fire detectors and portable fire extinguishers. PSE&G believes this exemption is justified on the basis that this is a continuously manned area and for personnel safety considerations. In addition, this design feature was previously approved by the NRC Staff. Since alternate capability will exist, there is no adverse affect on safety by not having a fixed suppression system.

Implementation Schudule:

The suppression system, Halon and CO_2, and fire detection have been installed in both Units. The new instrumentation has also been installed. The procedures for equipment operation will be completed by April 15, 1981.

III.J Emergency Lighting

Emergency lighting units with at least an eight hour battery power supply shall be provided in all areas needed for operation of safe shutdown equipment and in access and egress routes thereto.

Design Description:

PSE&G has previously committed to install an eight hour self-contained emergency lighting system. This has been approved by the NRC Staff.

Implementation Schedule:

Installation has been completed. Salem Units 1 and 2 are in compliance with this requirement.

III.O Oil Collection System for Reactor Coolant Pump

The reactor coolant pump shall be equipped with an oil collection system if the containment is not inerted during normal operation. The oil collection system shall be so designed, engineered, and installed that failure will not lead to fire during normal or design basis accident conditions and that there is reasonable assurance that the system will withstand the Safe Shutdown Earthquake.

Such collection systems shall be capable of collecting lube oil from all potential pressurized and unpressurized leakage sites in the reactor coolant pump lube oil systems. Leakage shall be collected and drained to a vented closed container that can hold the entire lube oil system inventory. A flame arrestor is required in the vent if the flash-point characteristics of the oil present the hazard of fire flashback. Leakage points to be protected shall include lift pump and piping overfow lines, lube oil cooler, oil fill and drain lines and plugs, flanged connections on oil lines, and lube oil reservoirs where such features exist on the reactor coolant pumps. The drain line shall be large enough to accommodate the largest potential oil leak.

Design Description:

A non-seismic reactor coolant pump oil collection system for the oil lift pump and discharge lines was installed as part of the original design. Modifications to this system can be made to meet seismic requirements and to cover the oil leakage areas described above.

Implementation Schedule:

PSE&G will perform the necessary analyses and modify the existing reactor coolant pump oil collection system to comply with this requirement. This will be completed prior to restart from the 1981 refueling outage for Unit 1 and prior to restart from the first refueling outage for Unit 2.

Should you have any questions in this regard, do not hesitate to contact us.

Very truly yours,

R. L. Mittl
General Manager -
Licensing and Environment

CC: Mr. Leif Norrholm
Senior Resident Inspector

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