

10/22/01

BACKFIT PANEL

ANO Triennial Fire Protection Inspection

FIRE PROTECTION REGULATIONS

10 CFR 50.48, Fire protection.

- (b) Appendix R to this part establishes fire protection features required to satisfy Criterion 3 of Appendix A to this part with respect to certain generic issues for nuclear power plants licensed to operate before January 1, 1979.
 - (2) With respect to all other fire protection features covered by Appendix R, all nuclear power plants licensed to operate before January 1, 1979, must satisfy the applicable requirements of Appendix R to this part, including specifically the requirements of Sections III.G, III.J, and III.O.

10 CFR Part 50, Appendix R, Paragraph III.G, Fire protection of safe shutdown capability.

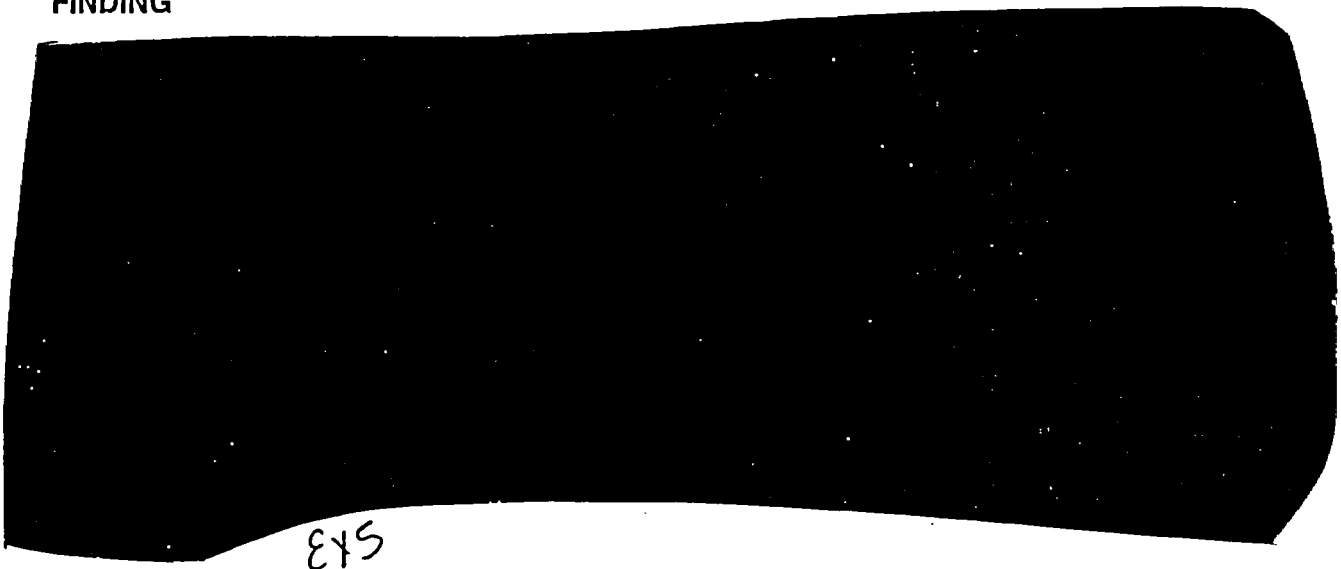
- 1. Fire protection features shall be provided for structures, systems, and components important to safe shutdown. These features shall be capable of limiting fire damage so that:
 - a. One train of systems necessary to achieve and maintain hot shutdown conditions from either the control room or emergency 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.
- 2. Except as provided in 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, of 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 3-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

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- c. Enclosure of cable and equipment and associated non-safety circuits of one redundant train in a fire barrier having a 1-hour rating, In addition, fire detectors and an automatic fire suppression system shall be installed in the fire area;

FINDING



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LICENSING BASIS

ANO was licensed prior to January 1, 1979. Appendix R, Sections G, J, and O were backfit by 10 CFR 50.48.

NRC SAFETY EVALUATION REPORTS

Fire Zone 98J (diesel generator corridor):

- SER dated March 22, 1983:

"The Commission has issued the enclosed Exemptions to certain requirements of Appendix R to 10 CFR 50 in response to your letter of July 1, 1982, as supplemented and amended by your letter of November 11, 1982."

With respect to 98J - *"The corridor contains primarily B-train cables, however there is one A-train conduit in the corridor." ... "By letter dated November 11, 1982, the licensee proposed to enclose the single A-train conduit in the corridor in a one-hour rated barrier."*

"The licensee has indicated that enclosure of the corridor A-train conduits in a one-hour rated fire barrier and separation of the DC equipment room from the corridor by three-hour rated fire barriers will be provided. With these modifications, the area will comply with Section III.G of Appendix R, and no exemption is needed."

- SER dated May 13, 1983:

"By submittals dated July 1, and July 29, 1982, the Licensee described the means by which safe shutdown can be achieved in the event of fire and proposed modifications to the Arkansas Nuclear One Units 1 and 2 to meet the requirement of Appendix R to 10 CFR 50, Items III.G.3 and III.L."

"All other areas of the plant not required to have alternate safe shutdown will comply with the requirements of Section III.G.2 of Appendix R, unless an exemption request has been approved by the staff."



Fire Zone 99M (north electrical switchgear room):

- Amendment No 35 and SER dated August 27, 1978:

Regarding Fire Zone 99M, in the safety evaluation of August 27, 1978, the NRC staff stated, *"The licensee has proposed to provide fire retardant board or blanket barriers to*

prevent fire from involving redundant cables required for safe shutdown in each of the switchgear rooms" (emphasis added).

- SER dated May 13, 1983: This SER addressed the safe shutdown capability of both units compared to the requirements of Sections III.G and III.L of Appendix R.

Regarding areas of the plant not requiring an alternative shutdown capability, Section C of this SER stated, "All other areas of the plant not required to have alternative safe shutdown will comply with the requirements of Section III.G.2 of Appendix R, unless an exemption request has been approved by the staff."



LICENSEE SUBMITTALS

- Licensee letter dated July 1, 1982:

"This zone [98J] is predominantly of the "green" or "B" safety division, although certain cables associated with the "red" or "A" division are also located in the corridor portion of the zone. The "A" cables in this zone are routed in conduit and are predominately associated with the "red" D.C. equipment room."

"The "red" division cabling located in the corridor that is required for safe shutdown will be wrapped in a 1-hour fire barrier. The circuits involved are the power supplies to the RS panels [120V ac to vital instrumentation] which are located in the control room. With the suppression system in this area and the addition of the 1-hour fire barrier, the corridor portion of this zone will comply with Appendix R."

"The "red" division cabling located in the corridor that is required for safe shutdown will be wrapped in a 1-hour fire barrier. The circuits involved are the power supplies to the RS panels which are located in the control room. With the suppression system in this area and the addition of the 1-hour fire barrier, the corridor portion of this zone will comply with Appendix R."

- Licensee letter dated November 11, 1982:

"Modifications to this zone will be made as stated in our July submittal except for those designed to "separate" the corridor area from the "red" D.C. equipment room. This separation will be accomplished by the addition of a 3-hour rated fire door and fire dampers in the ventilation ducts.

"With this modification, no exemptions are required for zone 98J."

From SRP 9.5.1

- (10) Metal deck roof construction should be noncombustible and listed as "acceptable for fire" in the UL Building Materials Directory, or listed as Class I in the Factory Mutual System Approval Guide.
- (11) Suspended ceiling and their supports should be of noncombustible construction. Concealed spaces should be devoid of combustibles except as noted in Position C.6.b.
- (12) Transformers installed inside fire areas containing safety-related systems should be of the dry type or insulated and cooled with noncombustible liquid. Transformers filled with combustible fluid that are located indoors should be enclosed in a transformer vault (see Section 450(c) of NFPA 70, "National Electrical Code").
- (13) Outdoor oil-filled transformers should have oil spill confinement features or drainage away from the buildings. Such transformers should be located at least 50 feet distant from the building, or by ensuring that such building walls within 50 feet of oil-filled transformers are without openings and have a fire resistance rating of at least 3 hours.
- (14) Floor drains sized to remove expected firefighting waterflow without flooding safety-related equipment should be provided in those areas where fixed water fire suppression systems are installed. Floor drains should also be provided in other areas where hand hose lines may be used if such firefighting water could cause unacceptable damage to safety-related equipment in the area (see NFPA-92, "Waterproofing and Draining of Floors"). Where gas suppression systems are installed, the drains should be provided with adequate seals or the gas suppression system should be sized to compensate for the loss of the suppression agent through the drains. Drains in areas containing combustible liquids should have provisions for preventing the backflow of combustible liquids to safety-related areas through the interconnected drain systems. Water drainage from areas that may contain radioactivity should be collected, sampled, and analyzed before discharge to the environment.

→ b. Safe Shutdown Capability

- (1) Fire protection features should be provided for structures, systems, and components important to safe shutdown. These features should be capable of limiting fire damage so that:
 - (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.
- (2) To meet the guidelines of Position C5.b.1, one of the following means of ensuring that one of the redundant trains is free of fire damage should be provided:
 - (a) Separation of cables and equipment and associated circuits of redundant trains by a fire barrier having a 3-hour rating. Structural steel

forming a part of or supporting such fire barriers should be protected to provide fire resistance equivalent to that required of the barrier;

(b) Separation of cables and equipment and associated 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 should be installed in the fire area; or

(c) Enclosure of cable and equipment and associated circuits of one redundant train in a fire barrier having a 1-hour rating. In addition, fire detectors and an automatic fire suppression system should be installed in the fire area.

(3) If the guidelines of Positions C5.b.1 and C5.b.2 cannot be met, then alternative or dedicated shutdown capability and its associated circuits, independent of cables, systems or components in the area, room, or zone under consideration should be provided.

c. Alternative or Dedicated Shutdown Capability

(1) Alternative or dedicated shutdown capability provided for a specific fire area should be able to achieve and maintain subcritical reactivity conditions in the reactor, maintain reactor coolant inventory, achieve and maintain hot standby* conditions for a PWR (hot shutdown* for a BWR) and achieve cold shutdown* conditions within 72 hours and maintain cold shutdown conditions thereafter. During the postfire shutdown, the reactor coolant system process variables shall be maintained within those predicted for a loss of normal ac power, and the fission product boundary integrity shall not be affected; i.e., there shall be no fuel clad damage, rupture, or any primary coolant boundary, or rupture of the containment boundary.

(2) The performance goals for the shutdown functions should be:

(a) The reactivity control function should be capable of achieving and maintaining cold shutdown reactivity conditions.

(b) The reactor coolant makeup function should be capable of maintaining the reactor coolant level above the top of the core for BWRs and be within the level indication in the pressurizer for PWRs.

(c) The reactor heat removal function should be capable of achieving and maintaining decay heat removal.

(d) The process monitoring function should be capable of providing direct readings of the process variables necessary to perform and control the above functions.

(e) The supporting functions should be capable of providing the process cooling, lubrication, etc., necessary to permit the operation of the equipment used for safe shutdown functions.

*As defined in the Standard Technical Specifications.