



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

OUTSTANDING FIRE PROTECTION MODIFICATIONS

COOPER NUCLEAR STATION

DOCKET NO. 50-298

1.0 INTRODUCTION

By letter dated May 4, 1982, the NRC granted an exemption to Nebraska Public Power District (NPPD), the licensee for Cooper Nuclear Station (CNS), with respect to the requirements of Section III.G of Appendix R to 10 CFR 50. That is, an extension was granted until June 30, 1982 for the submittal of plans and schedules to achieve compliance with Section III.G and for the determination of fire protection feature installation schedules as established in 10 CFR 50.48(c)(2) and (3). By letter dated June 28, 1982, the licensee provided the analysis required by the May 4, 1982 Exemption. As a result of this analysis, the licensee determined that the majority of the fire areas at CNS meet the requirements of Section III.G and requested technical exemptions for the remaining fire areas. This latter exemption was granted by NRC letter dated September 21, 1983.

By letter dated June 7, 1985, the licensee identified other plant areas that were recently discovered where the requirements of Section III.G.2 of Appendix R are not met. That is, situations were identified where adequate circuit separation does not exist between redundant systems or subsystems required to safely shut down the plant in the event of a fire. The potential fire damage in these areas was described as well as the five proposed modifications that would be implemented to correct the deficiencies in the areas of concern. An exemption was requested from the scheduler requirements of 10 CFR 50.48(c) to permit a delay until the 1986 refueling outage (scheduled to begin in the Fall of 1986) to perform the necessary modifications. The licensee also described the proposed compensatory measures that would be taken to upgrade the fire protection in the areas of concern in the interim before implementation. By letters dated July 18 and July 31, 1985, the licensee stated that one of the proposed modifications described in the June 7, 1985 letter would be completed before startup from the ongoing refueling outage.

As stated in the May 4, 1982 Exemption, a complete analysis against the provisions of Section III.G was required to be submitted by June 30, 1982. That is, the items described in the June 7, 1985 letter should have been identified in the June 28, 1982 submittal. The scheduler requirements of 10 CFR 50.48(c) do not permit further extensions for the completion of modifications identified after June 30, 1982, and, therefore, the requested exemption cannot be granted. The NRC has, however, evaluated the proposed modifications for acceptability with regard to Appendix R. The results of this evaluation are discussed below.

2.0 EVALUATION

2.1 Diesel Generator Exhaust Fan Power Feed

The licensee has determined that a fire in either the auxiliary relay room or the 882 ft. level of the Control Building has the potential to damage redundant motor control centers (MCCs) and/or cables which supply other MCCs that provide power to exhaust fans and heating, ventilating and air conditioning (HVAC) units for the individual diesel generator rooms. A postulated fire in either area could incapacitate the ventilation systems for redundant diesel generators. Without ventilation, the diesel generators would heat up excessively during operation and consequently would not be available to support safe shutdown with loss of offsite power.

The licensee has proposed to provide an alternate power supply to the exhaust fan and associated heating and ventilating controls for Diesel Generator No. 2. As a result of this modification, all power cables (except 125 VDC control power) for essential HVAC associated with this diesel generator would be eliminated from the fire areas of concern. The 125 VDC control power cables are wrapped with a fire retardant material to comply with the requirements of Section III.G.2 of Appendix R.

Based on our review, we conclude that the proposed modification will provide an adequate alternative shutdown capability for achieving hot shutdown in the event of a fire in the auxiliary relay room or on the 882 ft. level of the Control Building.

2.2 Gland Seal Water for Service Water Pump Bearings

The licensee has determined that a fire in either the auxiliary relay room or the 882 ft. level of the Control Building has the potential to damage redundant MCCs and/or cables which supply starter racks LZ and TZ. Redundant service water gland seal pumps are powered from these starter racks. With no source of gland seal water, the service water pumps would be subject to bearing failure and could not support safe shutdown of the plant.

The licensee has proposed to provide a back-up seal water supply to the service water pumps through a one-inch pipe from the existing 12-inch diameter fire protection piping in the service water pump room. The new one-inch piping will be isolated through a check valve and will connect upstream of the existing pressure control valve of the gland seal water supply. The back-up gland seal water will be normally isolated by a closed solenoid valve which will fail open and provide water to the service water pumps if power is lost to the gland seal pumps. A flow sensing device will be located downstream of the check valve to detect flow.

Based on our review, we conclude that the proposed modification to provide a backup source of gland seal water for service water pump bearings will provide an adequate alternative shutdown capability in the event of a fire in the auxiliary relay room or the 882 ft. level of the Control Building.

2.3 Safe Shutdown Instrumentation

The licensee has determined that a fire in either the Control Building basement (882 ft. level) or the 903 ft. level hallway could damage power feed cables to the Division I "1F" bus as well as cables V13 and V11 which supply power to the Division II critical instrumentation. A fire in either of these areas could therefore disable one whole division of safe shutdown equipment along with instrumentation for the other safe shutdown division. It was also determined that cable V3, a Division I instrumentation power supply cable, is routed through the 1B Battery Room (Division II). A fire in the battery room could therefore disable the Division II DC bus and some Division I instrumentation.

To ensure the availability of safe shutdown instrumentation in the event of a fire, the licensee proposed to remove cables V3, V11 and V13 from the fire areas of concern. The Division I cable (V3) will be rerouted through RPS Room 1A and the Division II cables (V11 and V13) will be rerouted through RPS Room 1B. In addition, the licensee proposes to upgrade the walls of RPS Room 1B to three-hour fire barriers. The fire door between RPS Rooms 1A and 1B will be replaced with a three-hour fire rated door or the doorway eliminated.

Based on our review, we conclude that the proposed modifications are acceptable methods to maintain safe shutdown capability in the event of a fire in the Control Building basement, 903 ft. level hallway or 1B Battery Room.

2.4 Circuit Isolation Switches

The licensee has determined that a postulated fire in various plant areas could produce hot short circuits in safe shutdown equipment interlock circuitry. That is, spurious energization of these interlock circuits due to fire damage could prevent operation of essential equipment. The spurious operation of these circuits in conjunction with other fire damage to redundant safe shutdown equipment in the fire areas of concern could prevent safe shutdown of the plant. The fire areas of concern, the equipment that could be damaged, and the proposed modifications to ensure post-fire safe shutdown capability are discussed below.

a. HPCI Interlock Cables

There are three high pressure coolant injection (HPCI) system interlocks which are activated respectively by a pressure switch, a level switch and a flow transmitter. The three interlock cables are routed at the 903 ft. and 931 ft. levels of the Reactor Building. A postulated fire in these areas could, therefore, prohibit the use of the HPCI system for safe shutdown of the plant as well as incapacitate other essential equipment. The licensee has proposed a modification which consists of installation of isolation switches, for the affected interlock cables, inside the auxiliary relay room to assure availability of the HPCI system for safe shutdown of the plant. Operation of the isolation switches in the event of a fire would preclude spurious operation of the HPCI interlocks.

b. Breaker "FA" Interlock Cables

The plant has interlocks which prevent connection of the diesel generator output to an already energized bus. The involved Division I interlocks are routed through Switchgear Room 1G. A postulated fire inside Switchgear Room 1G could result in unavailability of the Division II equipment for safe shutdown of the plant and cause spurious operation of the Division I interlocks. The licensee plans to install circuit isolation switches for the affected cables inside Switchgear Room 1F. This would preclude the spurious closure of Breaker "1FA" and thus would assure availability power supply to Division I equipment for safe shutdown of the plant.

c. Diesel Generator Output Breaker Interlock Cables

Each diesel generator output breaker has an interlock. The two cables for these interlocks are routed to a common area inside the Turbine Building. The two interlocks are provided, one for each diesel generator output breaker, to prevent the connection of the diesels to an already energized bus. A postulated fire in this common area could spuriously operate both interlocks thereby making the 1E power supply unavailable for the safety related equipment to provide safe shutdown of the plant. The licensee has proposed a modification to provide two circuit isolation switches, one for each diesel generator, inside their corresponding rooms, to assure the availability of 1E power supply to the essential safety related equipment for safe shutdown of the plant.

Based upon our review, we conclude that the proposed modification for isolation of the interlock cables provides the capability to achieve and maintain safe shutdown conditions and thus meets the requirements of Appendix R to 10 CFR 50, Items III.G.3 and III.L with respect to safe and alternate shutdown in the event of a fire.

2.5 Fire Doors

The licensee has determined that additional plant area enclosures must be upgraded to a three-hour fire rating to comply with the cable separation requirements of Section III.G.2 of Appendix R. To establish these new fire areas, fire doors in the following locations must either be verified as having a three-hour rating or new fire doors must be purchased:

- a. RPS Room B to Control Building corridor
- b. DC Switchgear Room B to Control Building corridor
- c. DC Switchgear Room A to Control Building corridor
- d. Battery Room B to Control Building corridor
- e. Battery Room A to Control Building corridor
- f. West doors - Relay Room to Control Building corridor

g. East doors - Relay Room to Control Building corridor

In addition, the licensee will document that the other doors and associated hardware in the newly-designated fire areas have the appropriate rating.

Based on our review, we conclude that the proposed modification will provide adequate separation for redundant divisions of safe shutdown equipment and cables.

3.0 CONCLUSION

Based on the above review, we conclude that the proposed modifications will ensure a safe shutdown capability in the event of a fire in the areas of concern in accordance with the requirements of Appendix R to 10 CFR 50 and are, therefore, acceptable.

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Dated: --August 21, 1985