Bob Ferguson Fort Calhoun

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August 25, 1980

Mr. Robert L. Ferguson
Chemical Engineering
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

RE: Fort Calhoun, Fire Protection Review

Dear Bob:

Attached is Brookhaven National Laboratory's input on Items 3.1.15/ 3.2.4, Cable Separation, Item 3.1.16, Fire Water Supply, Item 3.1.28, Protection for Stairways and Open Hatch, and Item 3.2.2, Testing Fire Detectors, for the Fort Calhoun nuclear power plant.

Respectfully yours,

Robert E. Hall

Robert E. Hall, Group Leader
Reactor Engineering Analysis

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Fire Protection Review

Items 3.1.15 and 3.2.4 - Cable Separation

SER Sections 3.1.15 and 3.2.4 indicate that the licensee will apply flame retardant coating or install fire barriers in areas where cable separation is a concern. The SER also stated that the licensee would describe the minimum separation between redundant cables and propose modifications to preserve safe shutdown where necessary.

By letter dated September 29, 1978, the licensee provided the results of a cable separation analysis and proposed various modifications for areas where the licensee judged cable separation to be inadequate. These fire areas are the following: 6, 31, 32, 34A, 34B, 36, 41, and 42. By various licensee letter submittals and phone calls, the separation in all of the areas is justified by enclosures or barriers. Areas 41 and 42 are being evaluated in the safe shutdown study; area 36 has been resolved and its separation is acceptable.

However, the other fire areas 6, 31, 32, 34A and 34B are unacceptable as submitted. For areas 32, 34A and 34B the barriers have been justified for IEEE 384 requirements, but not for an exposure fire. For area 6 and 31, the enclosures are designed for UL X-719 which is a continuous enclosure while the submitted enclosures for trays have joints.

It is our opinion that the cables in all fire areas have one of the redundant sets of cables rerouted out of the 5 areas. For area 6 and 31, the enclosures would be acceptable if the submitted designs were changed to be continuous as in UL X-719.

Item 3.1.16 - Fire Water Supply

SER Section 3.1.16 indicates that the motor-driven fire water pump recirculation line will be increased from 3 inches to 10 inches in diameter, and the pump intake line will be relocated so that previously experienced failure of the pump due to sand and silt clogging the pump intake will not occur. The licensee will also perform a special operational test of the fire water system on a sprinkler system mock-up.

By letter dated May 20, 1980, the licensee provided a description of the current pump suction line design, the results of normal surveillance testing since modifications were completed, and the results of testing a mock-up of a sprinkler system.

The test results indicate that the quantity of sand which flowed through the piping is unlikely to impair the performance of fire pumps or sprinklers. In addition, by letter dated July 13, 1978, the licensee indicated that the fire pump discharge strainer had a 250 micron screen and that all orifices in the sprinkler system are 1/4 inch or larger. Therefore, sand-clogging of sprinkler system pipes or orifices through which water is flowing is unlikely.

We recommend that this item be accepted provided that the licensee is requested to establish procedures to examine, test, or flush sprinkler system portions in which no flow occurred if one or more sprinklers in that system have operated. The procedures should follow the recommendations of NFPA 13A-1978, "Recommended Practice for the Care and Maintenance of Sprinkler Systems."

Item 3.1.28 - Protection for Stairways and Open Hatch

SER Section 3.1.28 indicates that the stairway in the electrical penetration area (Fire Area 34) will be enclosed by fire barriers to provide 3 hour rated separation between basement and ground levels. A water curtain actuated by smoke detectors will be provided at the open stairway and open hatch which join personnel corridors in the basement level (Fire Area 6) and the ground level (Fire Area 20).

By letter dated December 12, 1979, the licensee provided drawings and a description of the proposed water curtains. By letter dated January 18, 1980, the licensee indicated that the water curtains became operational on January 11, 1980. By letter dated March 14, 1980, BNL recommended that the NRC staff request the licensee to explain certain engineering features of the water curtain. In a telephone conference of April 18, 1980, the licensee gave further explanation of the system.

We recommend that this system be accepted provided the licensee is requested to verify that the loss of off-site power will not result in the nonavailability of water curtain protection for the stairway and open hatch, to provide 18 inch deep noncombustible draft stops immediately adjacent to the stairway and hatch openings, and to verify that water curtains have been hydraulically designed to discharge at least 3 gallons per minute per lineal foot of water curtain, measured horizontally around the opening with no sprinkler discharging less that 15 gallons per minute. The licensee should further verify that the demand for either water curtain, plus 1000 gpm for interior hose streams, can be met by existing fire water supply system.

Item 3.2.2 - Testing Fire Detectors

SER Section 3.2.2 indicates that the licensee will provide the basis and criteria for the installation and testing of fire detectors in the plant.

By letter dated January 8, 1979, the licensee submitted a Fire Detector Analysis which outlined the basis for location, spacing, and number of fire detectors in Plant Fire Areas 1 through 43. By letter dated July 9, 1979, the licensee responded to staff questions and concerns raised during a May 23, 1979 conference call.

BNL evaluation dated March 14, 1980 made further recommendations to the NRC. By a telephone conversation of April 18, 1980 and a letter dated May 20, 1980, these recommendations were resolved.

We recommend that you accept this item.