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SUBJECT: Forwards BNL design review & suppl recommendations re fire protection.

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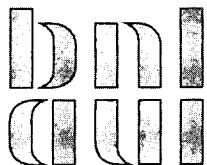
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Department of Nuclear Energy

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December 11, 1979

Mr. Robert L. Ferguson
Plant Systems Branch
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Bob:

Enclosed are the final Brookhaven National Laboratory design review and supplement recommendations for the H.B. Robinson Nuclear Power Plant,* as listed below. The recommendations represent a review conducted by Mr. E. MacDougall and Mr. J. Klevan.

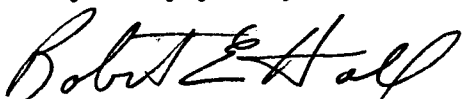
Design Review

3.1.2*
3.1.4*
3.1.11*
3.1.17*
3.1.21*
3.1.24*

Supplement

3.2.1 Tim Lee's item
3.2.2*
3.2.3*
3.2.4*
3.2.5*
3.2.6 Cal Heit's item
3.2.7 Tim Lee's item
3.2.8 Previously sent in
3.2.9*

Very truly yours,


Robert E. Hall, Group Leader
Reactor Engineering Analysis

REH:sd
enc.

cc.: R. Cerbone wo/enc.
 W. Kato "
 T. Lee
 E. MacDougall
 V. Panciera wo/enc.

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Fire Protection Review

3.1.2 Fire Detectors

SER Section 3.1.2 indicates that the licensee will add automatic fire detection devices in 18 fire areas of the plant, and will connect to an emergency power source those portions of the existing fire detection system not presently so supplied. The licensee has committed to confirm that detectors are appropriate for the type of combustibles likely to be found in the area in which they are installed, and to furnish a report of an audit of the installation design for smoke detectors in the plant to assure that room geometry and ventilation air flow have been properly considered.

By letter dated April 28, 1978, the licensee described the general procedures which would be followed to assure that smoke detectors are properly located in various plant areas and that their installation is correct according to engineering and installation requirements.

By letter dated April 2, 1979, the licensee provided additional information pertaining to the number and placement of fire detectors in various plant areas.

Of the various plant areas discussed in the SER,

- Some are satisfactory as is, without the addition of detectors (SER Sections 5.21 - 24, and 30)
- Some are not safety-related areas and will be satisfactory with proposed modifications (SER Section 5.10 and 13).
- One is safety-related and will be satisfactory with proposed modifications (SER Section 5.1).

The ultraviolet detectors being added in the diesel generator rooms operate on a line of sight principle. In all other plant areas, fire detection is based on the transport of sufficient heat or smoke from the fire to the detector. The information provided by the licensee does not discuss the effect on detector performance of ceiling height, location and orientation of beams at the ceiling, location of ventilation system inlets and outlets, or ventilation rate in sufficient detail for staff evaluation. In addition, it is not clear what is meant by the licensee's statement that detectors were "cross-zoned for optimum coverage."

We recommend that the licensee submit the details of a detector installation design audit or test for each plant area in which detectors are installed or proposed. We also recommend that the licensee clarify the meaning of the term "cross-zoned for optimum coverage."

3.1.4 Fire Retardant Cable Coating

SER Section 3.1.4 indicates that fire retardant coating will be applied to cables located in 13 different fire areas of the plant.

By letter dated December 5, 1978 the licensee stated that the flame-retardant coating would be applied in accordance with manufacturer's recommendations, and that the manufacturer would be consulted to determine alternate application methods for situations not covered by the manufacturer's standard recommendations.

We recommend acceptance of the licensee's proposal.

3.1.11 Portable Fire Extinguishers

SER Section 3.1.11 indicates that one 2 1/2 gallon pressurized water portable fire extinguisher will be added in the control room area and that several large pressurized water extinguishers will be provided in the containment cable penetration area.

By letter dated April 28, 1978 the licensee stated that large pressurized water fire extinguishers will not be provided because UL or FM listed extinguishers of this type are not available. The licensee has stated that other existing or proposed features of the containment will provide adequate means to ensure safe shutdown in case of a fire in containment.

The large pressurized water extinguishers were proposed by the licensee to assure an adequate fire suppression capability inside the containment in general, and at the cable penetration area in particular. Existing portable dry chemical extinguishers have a limited range and duration of discharge which may not be adequate to suppress postulated fires in containment. Automatic fire detection systems and flame retardant cable coatings are proposed to detect fires and limit the growth of cable fires, but neither will suppress fires. Accordingly, we recommend that the licensee install standpipes and hose stations in containment.

The licensee has not provided any information regarding the installation of the 2 1/2 gallon pressurized water portable fire extinguisher in the control room. We recommend that the licensee verify that this extinguisher has been installed.

3.1.17 Insulation of Pipes

SER Section 3.1.17 indicates that three hour fire rated insulation will be installed on the section of the "A" diesel generator fuel supply line which is routed through the "B" diesel generator room, and on the section "B" diesel generator service water line which is routed through the "A" diesel generator room.

By letters of June 30, 1978 and April 2, 1979, the licensee provided a brief description of the materials and conditions on which the analysis and design of the pipe insulation is based.

We recommend that the licensee submit the details of the analysis for review.

3.1.21 Lube Oil Shielding System

SER Section 3.1.21 indicates that a lube oil spill protection and control system has been proposed to be installed around each reactor coolant pump motor to prevent contact of lube oil with hot pump surfaces.

By letter dated December 5, 1978 the licensee provided a conceptual design and description of the proposed oil spill system for reactant coolant pumps. By letter dated April 2, 1979 the licensee stated that the design and installation of this system was being deferred pending further study of an alternate means of controlling reactor coolant pump lube oil fires. By letter dated April 27, 1979, the licensee stated that installation of fixed fire suppression systems was being considered in lieu of the previously proposed lube oil spill collection system and that a decision would be reached by July 1, 1979.

This information has not yet been received. We, therefore, recommend that the licensee install the proposed lube oil shielding system and to provide the design details for review prior to installation.

3.1.24 Electrical Cable Penetrations

SER Section 3.1.24 indicates that fire tests of the cable penetration designs used in this plant will be performed, and that those which do not exhibit appropriate fire resistance will be modified or replaced by acceptable tested designs.

By letter dated September 1, 1978, the licensee provided the results of the fire resistance tests of cable tray and conduit penetrations. The licensee stated that certain of the tested designs were representative of those at the plant, and that the tests demonstrated that these designs had 3 hour fire resistance ratings.

The tests were conducted in substantial agreement with the criteria prescribed by the staff except for three items:

- The conduit penetrations were not symmetrical, and were not tested from both sides.
- The hose stream test of the wall slab was conducted while using a spray nozzle set at an angle of 50 degrees while IEEE 634-1978 calls for a 30 degree included angle.
- A host stream test was not performed on the floor penetration test slab.

Also, the staff requested the licensee to clarify:

- The density of ceramic fire insulation used in the penetration seals,

- The type and percent fill of cables used in the test,
- The size of conduit seals in the plant compared with those tested.

By letter dated April 2, 1979 the licensee responded to the staff's concerns regarding the hose stream test for the penetration seals by comparing the construction of their penetration seal with one which had successfully passed a hose stream test.

By letter dated May 9, 1979 the licensee reported that conduit penetrations through fire barriers would contain a 9 inch thickness of silicone foam instead of the previously tested 12 inches. The licensee cited manufacturer's test data to support the reduction in foam depth.

The licensee has not addressed all of the staff's previously stated concerns. In addition, the licensee has not addressed the issue of a pressure differential applied across the penetration during the fire test, which was a part of the staff position on penetration seals since May, 1977. We request the licensee address these concerns so that a final resolution can be determined.

3.2.2 Fire Door Supervision

SER Section 3.2.2 indicates that, following the completion of the physical security evaluation, any remaining non-supervised fire doors protecting safety-related areas will be identified and a method proposed for assuring these doors remain closed.

By letter dated June 30, 1978 the licensee provided a set of marked-up drawings identifying all fire doors and indicating which would be locked and/or electrically supervised, and which would not be.

The licensee's response does not propose to supervise or lock all fire doors to safety-related areas. We recommend that the licensee justify the absence of locks and/or electrical supervision of all doors to areas containing safety-related cables or equipment. The licensee is requested to verify that electrically supervised doors are provided with a time delay alarm in a constantly manned location.

3.2.3 Propane Tank and Piping

SER Section 3.2.3 indicates that the licensee would provide an analysis of the fire hazard associated with the propane tank supplying the propane engine-driven fire pump. By letter of March 30, 1978 the licensee provided a discussion of the estimated consequences of accidents involving the propane tank.

The licensee has not provided any conclusive evidence that an explosion of the propane tank would not occur. Because of the proximity of the propane tank to equipment vital to plant safety, we recommend that the licensee:

- Replace the propane engine and associated supporting equipment with a diesel engine, or

- Relocate the propane engine-driven fire pump and associated equipment to a location substantially remote from any safety-related equipment.

3.2.4 Containment General Area

SER Section 3.2.4 indicates that the adequacy of the fire protection in the containment general area is still under review. The licensee had proposed to install smoke detectors in the areas recirculation units which serve this area and to provide large pressurized water extinguishers for manual fire suppression.

By letter dated April 28, 1978, the licensee stated that large pressurized water fire extinguishers will not be provided because UL or FM listed extinguishers of this type are not available. The licensee has stated that other existing or proposed features of the containment will provide adequate means to ensure safe shutdown in case of a fire in containment.

The large pressurized water extinguishers were proposed by the licensee to assure an adequate fire suppression capability inside the containment. Existing portable dry chemical extinguishers have a limited range and duration of discharge which may not be adequate to suppress postulated fires in containment. Automatic fire detection systems are proposed to detect fires, but will not suppress them. Accordingly, we recommend that the licensee install standpipes and hose stations in containment.

3.2.5 Containment Penetration Area

SER Section 3.2.5 indicates that the adequacy of fire protection in the containment penetration area is still under review. The licensee had proposed to install an automatic fire detection system, large pressurized water fire extinguishers, and flame retardant coating on cables.

Information provided by the licensee to date does not alleviate the staff's concern that a fire in this area might involve redundant divisions of cables. The staff had previously requested to visit a containment, but the licensee has not yet approved such a request. The staff cannot complete an evaluation without a detailed examination of this area. Accordingly, we recommend that the licensee make appropriate arrangements for the members of the staff fire protection review team to examine this area of the containment.

3.2.9 Fire Hydrant Cold Weather Protection

SER Section 3.2.9 indicates that the staff has not completed its evaluation of the adequacy of licensee programs intended to assure proper functioning of outside hydrants.

By letter dated April 28, 1978 the licensee indicated that hydrants would be inspected once a year, in the fall. The licensee has declined to make a spring inspection of hydrants on the basis that none have been damaged by freezing in 18 years at the plant. Nevertheless, the staff considers that a spring inspection should be a part of a prudent hydrant maintenance program.

We recommend that the licensee perform semi-annual inspections of outside hydrants.