Omaha Public Power District

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September 6, 1979

Director of Nuclear Reactor Regulation
ATTN: Mr. Robert W. Reid, Chief
Operating Reactors Branch No. 4
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Reference: Docket No. 50-285

Gentlemen:

The Omaha Public Power District submitted an Application for Amendment of Facility Operating License, dated March 13, 1978, requesting the Commission to revise Technical Specifications for the Fort Calhoun Station to permit use of reduced air flow rates in the spent fuel pool area and safety injection pump room. On May 16, 1978, the District met with members of your staff to discuss this Application. As a result of the meeting, on March 6, 1979, additional information was submitted to support our Application. The additional information provided results of analytical modeling and field testing which demonstrated the acceptability of proposed flow rates. Subsequently, the District received further questions from the staff via telephone communication which indicated that the analytical model provided by the District did not use a technique which was reviewed and approved by the Commission and, as such, was not acceptable. In response to the staff's concerns, the District authorized Combustion Engineering, Inc. to redo the analytical modeling using an approved code. The results of this analysis are attached.

Based on the results shown in the attached analysis, it is concluded that the safety injection pump room temperature will not exceed the 117°F peak reached at 55 minutes for at least the first 27 hour period following a LOCA. By this time, the shutdown cooling system is put in operation to cool the containment sump water. Even in the worst case, assuming that the sump temperature does not decrease after 100,000 seconds and assuming zero ventilation flow, it is estimated that the room temperature will not exceed 122°F for at least 72 hours following the LOCA (based upon linear extrapolation of Figure 2).

A reduction in the containment sump water temperature results in a reduction in the safety injection pump room's heat loading, thereby continuously reducing the rate of temperature increase. Additional assurance is provided by the conservative assumption that the containment building air cooling and filtration system is not in service during this interval. Normally this system would be in service to perform its designed engineered safety features functions, which would also reduce the containment building sump temperature.

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A remaining area of possible concern is an increase in room temperature due to pump motor heat. The analysis discussed above, which was performed to confirm the results of an analysis performed by the Omaha Public Power District, clearly demonstrated that room temperature will not exceed 117°F for at least 27 hours after a LOCA. The results of both of these analyses are supported by the results of an extensive testing program performed by the Distr. and previously reported to the Nuclear Regulatory Commission. All of these analyses and testing were performed assuming zero ventilation air flow through the pump rooms.

Obviously the operation of the safety injection pumps must be assured for periods of time much longer than the 27 hours discussed in the preceding paragraphs. This assurance is provided and demonstrated by the following discussion.

A review of the attached Figure 2, "Pump Room Atmosphere Temperature (°F) vs. Time", clearly shows that the pump room temperature reaches a peak of 117°F at about 3500 seconds after the LOCA, rapidly decreases, then gradually increases, reaches a second peak at 70,000 seconds, and then begins another decrease. By this time, a single safety injection pump is sufficient to cool the core. In addition, shutdown cooling is available to remove sump water heat. A steady-state calculation has been performed (see Enclosure 2) using the conservative assumption that sump water temperature does not decrease below 165°F. Even under these conditions, 1500 cfm of ventilation (less than 1/2 design flow) is sufficient to maintain the room temperature below 122°F. With zero ventilation flow available, 122°F will not be reached until several days after the LOCA, allowing ample time for ventilation to be restored.

The auxiliary building ventilation system consists of two supply fans, three exhaust fans, ducting, dampers, and controls and instrumentation. The equipment can be controlled from the main control room. The fans are powered from the station's normal 480 V power supply busses. However, under emergency conditions it is possible to power these units from the emergency power sources. The fans and ventilation ducting are designed and installed as seismic category 1 equipment. The power cabling for the fans is of the same quality as the plant's engineered safeguards cabling. However, this cabling has not been designated nor identified as being engineered safeguards quality. These features do provide a high quality ventilation system for safety injection pump room cabling. The quality of this system has been demonstrated by over five years of reliable service.

Based on the auxiliary building ventilation system design features and performance, there is an extremely high probability that at least one of the two supply fans and at least one of the three exhaust fans,

with associated ducting and controls, would be available to provide cooling to the safety injection pump rooms. The analyses and testing discussed in preceding paragraphs clearly demonstrate that adequate time is even available to effect repairs on the ventilation system and have equipment operable in a reasonable time period. The availability of this system provides yet additional assurance that the safety injection pumps will not be rendered inoperable due to pump overheating.

During the District's reviews and analyses of the safety injection pump room's temperatures following a LOCA, we identified a few items which would optimize operation of the safety injection pumps and the auxiliary building ventilation system. We therefore propose to make the following modifications:

(1) Install temperature detectors, with readout and alarms, in the control room to monitor safety injection pump room temperatures.

(2) Ensure that electrical power and control cables to redundant supply and exhaust fans are physically and electrically independent of their redundant counterparts.

(3) Perform additional reviews and modify that portion of the safety injection pump room's ventilation system as required to further assure the adequacy of that system to isolate or filter iodine which may be released to the pump rooms after a LOCA.

The details of the modification proposed in item (3) will be submitted to the Nuclear Regulatory Commission for review prior to modifications.

The preceding discussions and attached analyses, plus previous information presented to the Nuclear Regulatory Commission on this issue, clearly demonstrate the adequacy of the existing equipment to perform the necessary functions in a post-LOCA situation. The proposed modifications will provide additional assurance of this adequacy. The Application for Amendment of Facility Operating License DPR-40, dated March 13, 1978, as amended by our submittal dated March 6, 1979, is consistent with the above-referenced discussions and analyses. The District therefore respectfully requests that the Nuclear Regulatory Commission continue its review of that amendment.

Sincerely,

W. C. Jones
Division Manager
Production Operations

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WCJ/KJM/BJH:jmm

Attach.

cc: LeBoeuf, Lamb, Leiby & MacRae