Omaha Public Power District

1623 HARNEY • OMAHA, NEBRASKA 68102 • TELEPHONE 536-4000 AREA CODE 402

March 29, 1979

Mr. Victor Stello, Jr., Director
Division of Operating Reactors
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Reference: Docket No. 50-285

Dear Mr. Stello:

In accordance with NRC Inspection and Enforcement Bulletin 79-01, dated February 8, 1979, the Omaha Public Power District gave 24-hour notice, by letter dated March 16, 1979, that certain safety-related electrical equipment installed at the Fort Calhoun Station had failed to meet environmental qualification criteria. This letter provides, by attachment, a detailed written report addressing this subject. The report clearly demonstrates that the health and safety of the public is not jeopardized by this situation.

Sincerely,

T. E. Short
Assistant General Manager

TES/KJM/BJH:jmm

Attach.

cc: Mr. Robert W. Reid, Chief
Operating Reactors Branch No. 4
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Mr. K. V. Seyfrit, Director
U. S. Nuclear Regulatory Commission
Office of Inspection and Enforcement
Region IV
611 Ryan Plaza Drive, Suite 1000
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1757 "N" Street, N. W.
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ATTACHMENT

Several types of stem-mounted limit switches were identified in the Fort Calhoun Nuclear Station as being unqualified for service within a LOCA environment. The types identified, as well as the number of unqualified switches, are listed below. Note that these limit switches are all located on containment isolation valves.

NAMCO D2400X 9 x 2 switches/valve = 18 switches
NAMCO D1200G 13 x 2 switches/valve = 26 switches
Fisher Type 304 14 x 2 switches/valve = 28 switches

In all cases identified above, the limit switches function to provide valve position indication (light indication) only. In no case will the failure of these limit switches cause inadvertent valve operation or prohibit the function of other safety-related circuits to perform their designed function. Listed below are the four possible failure modes of the limit switches in question. An analysis of the consequences resulting from each mode of limit switch failure is also given.

Mode 1

Switch shorts - This would result in possible indication of both "open" and "closed". This mode of failure in no way inhibits valve operation or control.

Mode 2

Switch open circuit - This would result in a complete loss of position indication. Valve operability/control, however, would not be affected.

Mode 3

Grounding of the power supply through switch failure - The valve circuitry is designed such that the Fort Calhoun instrument buses will operate with a ground. The circuit design is such that only one line to ground (the negative base) would occur. The other line is held above ground by the resistance of the indication circuit. In the highly unlikely event that both lines, positive and negative, are grounded, the control fuse located in each individual containment isolation valve circuit would "blow" and the valve would assume its fail safe position.

Mode 4

Possible tracking to the solenoid circuit - The probability of this mode of failure is extremely unlikely, since the solenoid leads are insulated and separated from the limit switches by the "distance of mounting". Should the limit switch track to the solenoid by means of water/saturated steam, the conductivity of this water/saturated steam would have to be near that of copper wire. A "ball-park" conductivity figure of 1% boric acid solution (approximately 1800 ppm boric acid) is 15×10^{6} mhos. This number is exceedingly small

as compared to the conductivity of bare copper wire; therefore, the likelihood of tracking to the solenoid circuit from the limit switch is highly unlikely.

Assuming tracking to the solenoid can occur, the current fed to the solenoid would be insufficient to make it operate due to the limiting function of the light indication circuitry. Analysis has shown that, if tracking did occur from the limit switch to the solenoid, the amperage which would be supplied to the solenoid would be approximately .04 amps. This is far below the .13 amps required to operate the solenoid. Therefore, it is concluded that the occurrence of "tracking" will not cause any malfunction or loss of valve operability and will not inhibit any valve from carrying out its designed or intended functions. In addition, tracking would not cause the malfunction of any other safety related equipment.

It is emphasized that in no case will the failure of these limit switches cause inadvertent valve operation or prohibit the function of other safety-related circuits to perform their design function.