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UNION ELECTRIC

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Gentlemen:

Reply to Open Item, Inspection Report 50-483/91020
Summary of Actions Taken to Resolve
MOV Degraded Voltage Performance

This letter provides a summary of actions taken as a result of an open item on motor operated valve (MOV) power factor and degraded voltage performance identified during an NRC inspection of Callaway's MOV program. This inspection assessed Callaway's conformance to requirements of NRC Generic Letter 89-10, "Safety-Related Motor-Operated Valve Testing and Surveillance", (2515/109). A written response to the open item was requested in your February 13, 1992 transmittal of inspection report number 50-483/91020(DRS).

In response to the open item, the following actions have been completed:

1) The IEEE-399 standard committee was contacted to determine the applicability of a 0.2 power factor for motors less than 1000 horsepower. From this discussion, it was determined that the 0.2 power factor listed in IEEE-399 is not valid for fractional horsepower motors.

2) The valve operator manufacturer (Limitorque) and motor manufacturer (Reliance) were contacted to obtain specific power factor data. A priority purchase order has been issued to procure this information; however, as of this date, the actual motor data has not been received.

3) Limitorque did provide a table of bounding motor locked rotor power factors for each motor frame size and pole configuration utilized at Callaway. These locked rotor power factors ranged from 0.63 to 0.83.

4) Voltage drops were recalculated utilizing these bounding locked rotor power factors for all the affected safety-related motor operated valves.

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5) The results of these calculations were then input into the Limitorque sizing equations to determine valve operability.

6) For those valves with unacceptable results, specific evaluations were performed as applicable for each valve using the following methods:

   a) The actual worst case voltage at each motor control center was utilized in lieu of the generic worst case voltage of 92% of 460 volts AC.

   b) The actual cable lengths for each valve were utilized in lieu of the computed route lengths.

   c) New calculated voltage drops determined by the adjustments in a) and b) were then input into the Limitorque sizing equation.

   d) The design differential pressures (ΔP) were reviewed and revised to reduce any unnecessary conservatism.

   e) Justifications were developed for use of valve train coefficient of friction of 0.15. The coefficient of friction of 0.15 was input into the sizing equation.

   f) When test data was available, indicating that an MOV was capable of opening against hydrostatic ΔP conditions at 80% voltage, running efficiency was used in the sizing equations.

7) After completing the actions described in item 6), calculations for two valves, EM-HV-8923 A and B, indicated a potential problem in meeting the stem thrust requirements. We then applied an alternate method utilizing EPRI-NMAC NP-6660-D to evaluate valve operability. This method provides justification for utilizing current at rated starting torque versus the locked rotor current. Using the EPRI-NMAC methods, these two valves were also demonstrated to be operable. As discussed in the January 27, 1992 telecon with the inspection team and other NRC staff members, these valves are maintained in the open position and are only required to isolate a passive failure 24 hours after an accident scenario. With this as the valve's sole safety function, there is time for taking action to mitigate a passive failure if these valves are not capable of stroking under ΔP conditions.

The following actions are continuing to address this open item:

1) Once actual locked rotor power factors are received from Limitorque, they will be reviewed against the power factors utilized in the revised calculations to verify that conservative power factors were used and that all valves remain operable.

2) As a result of this review, six valves were identified that have a minimum design margin remaining under the current design bases conditions. To address this concern, larger actuators will be installed on valves EM-HV-8807A and B, EM-HV-8923A and B, and EG-HV-62. The sixth valve, EM-HV-8924 serves no safety function but is a concern under the "mispositioned valve" scenario. Accordingly, a design change will be implemented to permanently block the valve in the open position by electrical de-energization. These modifications, contingent upon material receipt, will be pursued for implementation in our next refuel outage scheduled to start March 20, 1992.

This summarizes the actions completed to date and two ongoing actions. We stand ready to discuss any questions you may have on these actions.

Very truly yours,

Donald F. Schnell

DFS/CDN/tmw

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