GULF STATES UTILITIES COMPANY

RIVER BEND STATION POST OFFICE BOX 220 ST. FRANCISVILLE, LOUISIANA 70775

AREA CODE 504 635-6094 346-8651

July 24, 1985
RBG- 21683
File Code: G9.5, G9.25.1.1

Mr. Robert D. Martin, Regional Administrator
U.S. Nuclear Regulatory Commission
Region IV
611 Ryan Plaza Drive, Suite 1000
Arlington, Texas 76011

Dear Mr. Martin:

River Bend Station - Unit 1
Docket No. 50-458
Final Report/DR-280

On July 23, 1985, GSU notified Region IV by telephone that it had determined DR-280 concerning the loss of torque of Reliance motors in motor-operated valves with Limitorque actuators to be reportable under 10CFR50.55(e). The attachment to this letter is GSU's final 30-day written report pursuant to 10CFR50.55(e)(3) with regard to this deficiency.

Sincerely,

L. A. England
for J. E. Booker
Manager-Engineering,
Nuclear Fuels & Licensing
River Bend Nuclear Group

PJD
JEB/PJD/amg

cc: Director of Inspection & Enforcement
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

NRC Resident Inspector-Site

INPO

85-680

IE-27
1/1

ATTACHMENT

July 24, 1985
RBG- 21683

DR-280/RELIANCE MOTORS IN
MOV'S WITH LIMITORQUE ACTUATORS

Background and Description of the Problem

The deficiency concerns the loss of torque of Reliance motors in motor-operated valves with Limitorque actuators. The condition was observed by Wyle Laboratories during the testing of a Limitorque motor-operated valve (MOV) actuator (Model SMB-3-150) as part of the General Electric Company (GE) Phase 3 Environmental Qualification Program. During the testing of the motors for design basis event under elevated temperatures, two operator motors failed after one week and two weeks, respectively, of testing in a harsh environment.

The rotor used in the motor that failed is made of magnesium alloy. The rotor made of magnesium alloy is generally used when high motor torque is required. When the rotor was subjected to a steam environment, the rotor bar at the interface with the end ring corroded, which led to separation of the end ring from the conducting bars. The corrosion starts at a slower rate initially and later accelerates. During the testing performed by GE, the original motor operator was aged, irradiated, and seismically tested prior to being placed in the LOCA chamber. At the outset of the LOCA test, the MOV operated within the design limits and continued to do so for up to 7 days into the LOCA simulation. Shortly thereafter, the motor operator could not produce the required torque to operate the valve within its design requirements. A replacement motor (with magnesium rotor) was installed and the test continued (temperature at this point was 245°F, all-steam environment). Fourteen days later, the second motor failed in a manner similar to the first motor. The motor manufacturer's (Reliance's) evaluation indicated the presence of corrosive products. The corrosion had progressed to the point where the rotor end ring separated from the conductor bar. A third motor (with magnesium rotor) was installed, and the test continued (temperature 223°F, all steam environment). After 43 days in the LOCA chamber, this motor also experienced the same type of failure. Voltage and current measurements were taken during the cycling of the third motor. These measurements, particularly motor inrush current measurements, show progressive rotor degradation over the test period.

Safety Implication

The environmental qualification tests performed by GE, which exceed the River Bend environmental conditions with significant margin, demonstrate that the subject valve motors in question will operate successfully for at least seven days. Thus, assuming a failure of all subject valve motors at seven days will not in any way affect the short term response to a

transient or LOCA. Hence, the area of concern becomes the long term cooling of the core and the containment.

All valves supplied with Reliance motors having magnesium rotors have been identified. Six (6) of these valves have an operability requirement of more than 12 hours. Of these, only two valves (1E12*MOV42A and B) are affected by the condition described herein. Conservatively assuming that the MOVs fail following seven days, leaving the valves in the "as is" position, the then operating ECCS system(s) will continue to maintain the reactor in the cold shutdown condition. A subsequent single failure in the then operating ECCS system would require the initiation of one of the non-operating ECCS systems. Without considering other sources of cooling (CRD, Condensate booster pumps, etc.), this failure could leave the plant with inadequate long term cooling.

Corrective Action

A caution statement will be incorporated in Emergency Operating Procedure (EOP) No. 0001 to open valves 1E12*MOV42A and B and leave them in the open position based on GE's recommendations. A note will also be added to the procedure to address the other valves. EOP-0001 will incorporate the above information prior to initial criticality.