GULF STATES UTILITIES COMPANY

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

AREA CODE 504 635-6094 346-8651

December 6, 1993
RBG-39532
File Nos. G9.5, G15.4.1

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Gentlemen:

River Bend Station - Unit 1
Docket No. 50-458/93-09

NRC Inspection No. 50-458/93-09 was conducted by Messrs. A. Singh, H. Bandy, M. Murphy, A. Fresco and K. Sullivan from March 29 through April 2, 1993, of Gulf States Utilities Company's (GSU) River Bend Station (RBS) fire protection program. The inspection report identified the RBS fire hazards analysis as not containing information necessary to support certain assumptions that electrical control circuits required to assure a safe shutdown of the facility would not be adversely affected by certain associated circuits (Item No. 50-458/9309-01). In its response to the Notice of Violation GSU committed to revise RBS design criterion document 240.201 and restructure it into a complete post-fire safe shutdown analysis (SSA), including completion of an associated circuits, common enclosure analysis.

Per NRC request in the letter from S. J. Collins to P. D. Graham dated August 16, 1993, acknowledging GSU's response to the Notice of Violation, this letter provides a summary of the modifications to equipment and procedure changes identified during revision of the RBS SSA.

Should you have any questions, please contact Mr. D.N. Lorfing at (504) 381-4157.

Sincerely,

James J. Fisicaro

James J. Fisicaro
Manager - Safety Assessment
and Quality Verification
River Bend Nuclear Group

IE01
1/1

140031

Attachment

cc: U.S. Nuclear Regulatory Commission
Region IV - Regional Administrator
611 Ryan Plaza Drive, Suite 400
Arlington, TX 76011

NRC Resident Inspector
P.O. Box 1051
St. Francisville, LA 70775

ATTACHMENT

NRC Inspection 93-09 was conducted from March 29 through April 2, 1993, focusing on GSU's RBS fire protection program. The inspection report identified the fire hazards analysis as not containing information necessary to support certain assumptions that electrical control circuits required to assure a safe shutdown of the facility would not be adversely affected by certain associated circuits (Item No. 9309-01). In its response to the Notice of Violation GSU committed to revise RBS design criterion document 240.201 and restructure it into a complete post-fire safe shutdown analysis (SSA), including completion of an associated circuits,common enclosure analysis.

As noted in the violation, the need for an associated circuit, common enclosure analysis at RBS was identified for cables used for 120 volt AC and 125 volt DC service. Associated circuits of concern were defined as those cables (safety related, non-safety related, Class 1E, and non-Class 1E) that[1]:

1. Have a physical separation less than that required by Section III.G.2 of Appendix R, and;

2. Have one of the following:

    a. a common power source with the shutdown equipment (redundant or alternative) and the power source is not electrically protected from the circuit of concern by coordinated breakers, fuses, or similar devices, or

    b. a connection to circuits of equipment whose spurious operation would adversely affect the shutdown capability (e.g., RHR/RCS isolation valves, ADS valves, PORVs, steam generator atmospheric isolation dump valves, instrumentation, steam bypass, etc.), or

    c. a common enclosure (e.g., raceway, panel, junction) with the shutdown cables (redundant and alternative) and,

        (1) are not electrically protected by circuit breakers, fuses or similar devices, or

        (2) will allow propagation of the fire into the common enclosure

Completed as part of these projects were item 2c and portions of item 2b above.

Immediately after the associated circuits, common enclosure concern was identified an analysis was completed for the drywell and main steam tunnel which are normally inaccessible to firewatches. All cables of concern entering the main steam tunnel or the drywell were evaluated

---

[1] Memorandum from R. J. Mattson to D. G. Eisenhut, "Fire Protection Rule - Appendix R," March 22, 1982.

and found to be adequately protected or a cable failure analysis was completed to determine that a fire induced failure of these cables is not an associated circuit, common enclosure hazard.

Concerns for the adequacy of circuit protection apply only to cables at service levels below 480 volts; however, 480 volt and 4160 volt circuits were sampled to re-verify the adequacy of the protective devices to preclude a common enclosure hazard.

GSU procured the services of a contractor to revise RBS design criterion document 240.201 and restructure it into a complete post-fire safe shutdown analysis. Communication between the contractor and GSU was addressed in the project proposal. GSU was promptly notified of all apparent discrepancies identified in the areas of shutdown methodology, equipment selection/availability, and procedures. Upon notification of a discrepancy, GSU processed the information in accordance with appropriate plant procedures and took all necessary corrective actions. Identified discrepancies which were determined to impact safe plant operation were communicated to the NRC immediately through Mr. J. Gagliardo (or his designee) of your staff.

GSU also organized a multi-discipline fire protection team including a fire protection engineer, senior reactor operator, system engineer, electrical design engineer, nuclear safety engineer, civil structural engineer, and maintenance fire protection coordinator. This team maintained involvement in fire protection issues and participated in the revision of the SSA, including reviewing and approving output from the contractor. Several members of the fire protection team traveled to the contractor's office to review the SSA on two separate occasions, September 12-17 and October 4-10, 1993. All of their questions and comments were fully investigated prior to issuance of the SSA. They also met with senior management on a monthly basis through the duration of the corrective action program. These meetings served to focus appropriate management attention on outstanding fire protection issues. Communication was maintained on a frequent basis to ensure that all concerns were sufficiently addressed in the final report.

During the project planning phase GSU scheduled November 11, 1993, as the expected date to issue the final SSA. However, due to the heightened awareness and questioning attitude of the fire protection team during their reviews of the SSA, several concerns were identified. The thorough evaluation of these concerns delayed the final issue of the SSA to November 24, 1993. These concerns and their respective corrective actions are described below.

ASSOCIATED CIRCUITS, COMMON ENCLOSURE

During the review of the SSA, ten circuits were found which have the potential to damage cables required for safe shutdown Method 1E when Method 1E is needed for post-fire safe shutdown. These circuits do not have adequate overcurrent protection and share a raceway with a cable required for safe shutdown Method 1E. In the event of a main control room (MCR) fire, these ten circuits could be damaged due to overcurrent and may cause damage to safe shutdown cables in a raceway remote from the MCR.

Modification request (MR) 93-0060 was initiated to install properly sized fuses in the circuits associated with these cables. The circuits that form an associated circuit, common enclosure concern are scheduled to be modified before the end of RF-5. In the interim, the affected cables have been treated as having a missing fire barrier per 10CFR50, Appendix R, III.G.2. Thus, the action statement for RBS Technical Specification 3/4.7.7, "Fire Rated Assemblies," was entered and a roving fire watch has been maintained in the MCR and areas of the plant containing the affected raceway.

STANDBY SERVICE WATER COOLING TOWER FANS

Analysis of the control circuits for the Division I standby cooling tower (SCT) fans identified the potential loss of the ability to start the Division I SCT fans (1SWP*FN1A,C,E,G,J,L,Q,S and U) from their local motor control center (MCC) following a MCR fire. The RBS FHA takes credit for starting the SCT fans from the MCC during a MCR fire. In the event of a MCR fire, the control circuits for the SCT fans could short and blow the fuse protecting the circuit. The circuit is not isolated from the MCR, therefore, after repositioning the local remote selector switch at the MCC, fan starting would not occur due to the short circuit. Replacement of the fuse, as stated in the FHA, would not solve the problem since this does not remove the short from the circuit.
The corrective action for the standby cooling tower fans was to implement MR 93-0056. This MR provided fuses to isolate portions of the affected circuits which enter the MCR from the portions of the circuit required for remote shutdown functions. The additional fuses ensure that the standby cooling tower fans will be available following a fire in the MCR.

DIVISION III CONTROL CIRCUITS

Conduit 1CC003OC containing cables providing control power to 4.16 kV circuit breakers associated with Division III incoming line breaker 1E22*ACB04, Division III diesel generator output breaker 1E22*ACB01, and Division III 480 volt supply transformer breaker 1E22*ACB03 was not fire wrapped in fire area C-24 (116 ft elevation of the control building). The equipment listed above is credited for post fire safe shutdown for a fire in fire area C-24. The cables in conduit 1CC003OC associated with Division III safe shutdown equipment found to be unprotected were incorrectly shown as spared in the Electrical Cable Scheduling and Information System. If a fire damaged safe shutdown cables in the noted conduit, Division III power could be unavailable to standby service water components served by Division III power. The corrective action consisted of a change to the shutdown methodology credited in the SSA which eliminated the need to protect conduit 1CC003OC. These changes were also incorporated into Abnormal Operating Procedure (AOP) 0052, "Fire Outside Main Control Room (In Areas Containing Safety Related Equipment)."

SERVIC WATER VALVES

Four service ater system (SWP) valves were identified to be a spurious concern during a fire event. Two of the affected valves (1SWP*MOV506A & B) could spuriously misposition, open, and allow the diversion of one division SWP into the opposite division; or the same valves could spuriously misposition, close, and preven. the flow of standby service water through t..e Division III diesel generator cooling water heat exchanger (1E22*ES001).

The other two valves (1SWP*MOV 74A & B) could also spuriously misposition, open, and cause the diversion of one division of SWP into the opposite division; or the same valves could spuriously misposition, close, and prevent the flow of standby service water through the high pressure core spray (HPCS) room unit cooler (1HVR*UC5).

Valves 1SWP*MOV74A & 1SWP*MOV506A must remain open and valves 1SWP*MOV74B & 1SWP*MOV506B must close in order to establish the Division I / Method 1 flow path. The same valves must be positioned in the opposite configuration in order to establish the Division II / Method II flow path. Control and power cables for valves 1SWP*MOV74A and 1SWP*MOV506A are supplied by Division II circuitry and routed in areas in which Division II cables are assumed damaged by the fire. A fire anywhere along the cable path could cause a hot short and spuriously open or close the valve. The same condition exists for valves 1SWP*MOV74B & 1SWP*MOV506B for the opposite train (Division II / Method 2 valves using Division I power).

Although a sufficient quantity of water can flow through 1HVR*UC5 and 1E22*ES001 with only one train open to maintain operability, the normal flowpaths should be established when time permits. Since the valves are normally in the correct position to achieve safe shutdown, the corrective action was to add operator actions to AOP-0031, "Shutdown From Outside the Main Control Room," and AOP-0052, "Fire Outside Main Control Room (In Areas Containing Safety Related Equipment)," to verify that the valves are in the correct configuration as the situation may require.

REMOTE SHUTDOWN PANEL

During the revision of the RBS SSA the electrical design member of the fire protection team discovered that the control circuits for 4160 volt and 480 volt circuit breakers may not function properly in the event of a MCR fire. These circuit breakers supply power to loads required for remote shutdown from outside the MCR. For the 4160 volt and 480 volt loads required for safe shutdown, it was found that fuses protecting the control circuits for these loads did nc adequately protect the cables in the circuits. In the event of a MCR fire, these circuits could short in the MCR. Due to the length of the cable in these circuits, there would be insufficient short circuit current to blow the fuse before the occurrence of cable damage. The postulated ten minutes to exit the MCR and operate the transfer switches to isolate the MCR from remote shutdown systems is greater than the estimated time in which cable damage would occur. The

cable which would be damaged contains conductors which are required for remote shutdown as well as conductors that are isolated by the remote shutdown transfer switch. The following list shows the components affected:

1E22*S004	1HVC*ACU2A
1E22*S001G1C	1SWP*P2A
1E22*S002	1SWP*P2C
1EJS*LDC1A	1HVK*CHL1A
1EGS*EG1A	1HVP*FN2A
1ENS*SWG2A	1HVR*UC1A
1E12*PC002A	1HVR*UC11A
1ENS*SWG1A (normal and alternate supply breakers)	1HVK*CHL1C

The corrective action for this concern was completed with the installation of appropriately sized fuses to ensure that circuits are available for post fire safe shutdown or that they are no longer an associated circuit concern. GSU expedited the completion of the 17 fuse installations, restoring those circuits that serve credited safe shutdown equipment within the time limit of the technical specification LCO. As a followup action a thorough review of the remote shutdown system was completed to verify that no other control circuits for 4160 volt and 480 volt circuit breakers could prevent remote shutdown capability in the event of a MCR fire due to inadequately sized fuses.

50.59 FOR WATER CURTAIN

As corrective action for problems with the containment airlocks, GSU reviewed all MRs and associated USQDs (LER 93-003, supplement 1). During this review effort, problems were identified in MR 85-0548 and in its safety evaluation. MR 85-0548 was written to provide a method of protection, other than fire-rated barrier, for three valves required for the RBS post-fire safe shutdown methodology. These valves and their locations are as follows:

D-Tunnel (Fire Area AB-7)	E-Tunnel (Fire Area PT-1)
1E12*MOVF068B	1SWP*MOV501A
1SWP*MOV096B	

The MR states, "...certain sprinkler densities can equilibrate to hourly fire ratings." However, the fire protection engineer identified the fact that the use of a "water curtain" as a rated fire barrier has not been endorsed by the National Fire Protection Association (NFPA). In this particular case the deviation to section C.5.b.(2) of Branch Technical Position (BTP) CMEB 9.5-1, substitution of a "water curtain" for a rated fire barrier, is outside the scope of 10CFR50.59.

An evaluation of the configurations described above resulted in the identification of the following corrective actions:

* An evaluation per 10CFR50.59 justifying the equivalency of the separation of valve 1SWP*MOV501A and its redundant valves in Fire Area PT-1 with that required by Section C.5.b.(2) of BTP CMEB 9.5-1 was generated.

* A manual operator action, outside of Fire Area AB-7, was implemented to account for the loss of valve 1SWP*MOV096B in the event of a fire in Fire Area AB-7.

* Valve 1E12*MOVF068B will be protected with a one-hour rated fire barrier in Fire Area AB-7. The schedule for this action will be addressed in the RBS Thermo-Lag corrective action schedule which will be submitted within one month of the completion of the NUMARC Thermo-Lag testing program. Fire Area AB-7 will remain under an hourly firewatch until this issue is dispositioned under the overall Thermo-Lag plan.

As part of the corrective action for the containment airlocks issue, intensive training in the preparation and review of 10CFR50.59 evaluations has been provided for all engineers within the last year. Engineering supervision has repeatedly emphasized the use of NSAC 125 guidance during preparation of USQDs. GSU's increased emphasis on attention to detail and technical accuracy of 10CFR50.59 evaluations provides a high level of confidence that this error will not be repeated in the future. In addition, GSU's intensive review of previous 10CFR50.59 evaluations provides confidence that this is the only case of its kind.

REACTOR HIGH WATER LEVEL TRIP

While verifying revisions to procedure AOP-0031, "Shutdown from Outside the Control Room," resulting from the revised SSA, an operator assisting with the SSA revision discovered that a fire in panel 1H13-P612 or 1H13*P680 in the main control room could disable the continuity of 125 volt DC circuity to the "Reactor High Water Level" (Level 8) trip circuitry or the breaker control circuitry for the reactor feedwater pumps. This could cause a loss of automatic shut-off of feedwater supply into the reactor pressure vessel (RPV). This potential loss of 125 volt DC circuit continuity would occur if the fire created circuit faults such as open circuits or hot shorts which resulted in a loss of the ability to provide power to trip coils or which blew control circuit fuses. The only instance in which the proposed scenario could occur is if the fire disabled the continuity of the 125 volt DC cables in a continuously monitored and manned panel (P680) in the main control room without initiating the Halon suppression system protecting the wireways containing the affected cables.

Immediately after this condition was identified, a MCR Fire Response Brief was written to inform oncoming shifts of the identified concern and established new interim measures in the event of a MCR fire (i.e., a dedicated operator will be immediately dispatched to the normal

power supply switchgear (NPS-SWG) located in normal switchgear building regardless of fire severity). The MCR Fire Response Brief provides heightened operator awareness of the condition described above. Also, a Standing Order was written to provide operators with instructions for responding during a MCR fire at panel 1H13*P680. The Standing Order coupled with heightened operator awareness provides adequate assurance that this is not a condition adverse to quality and that the plant can be safely shutdown in the event of a MCR fire.

Two alternatives for long term corrective action are currently being evaluated. The first is to provide adequate separation of the redundant ability to secure the reactor feedwater pumps from the control room. The second is to establish a control location independent of the MCR to secure the reactor feedwater pumps.

DATE WHEN FULL COMPLIANCE WILL BE ACHIEVED

The associated circuit, common enclosure analysis was completed on October 27, 1993. The final report for the RBS Safe Shutdown Analysis was delivered to GSU on October 11, 1993, and revised on November 8, 1993. The subsequent actions resulting from the final SSA and associated circuits analysis (e.g., incorporation of these documents into the RBS fire hazards analysis, necessary revisions to procedures, and distribution) were completed by November 25, 1993. All plant modifications required as a result of the above projects which have not yet been completed will be implemented prior to the end of the fifth refueling outage at RBS, currently scheduled to begin on April 16, 1994.