GULF STATES UTILITIES COMPANY
POST OFFICE BOX 2951 • BEAUMONT, TEXAS 77704
AREA CODE 409 838-6631

August 26,1985
RBG- 21924
File Nos. G9.5

Mr. H.R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Denton:

River Bend Station Unit 1
Docket No. 50-458

On January 15,1985, Gulf States Utilities (GSU) submitted an interim response to ten items identified by members of the Advisory Committee on Reactor Safeguards (ACRS) during the full committee ACRS meeting held on July 12,1984. Please find attached GUS's updated positions with respect to each of these items.

Sincerely,

J. E. Booker

J.E. Booker
Manager - Engineering
Nuclear Fuels & Licensing
River Bend Nuclear Group

JEB/BEH/ko

Attachment

B001
1/1

ATTACHMENT

Item No. 1

The dedicated diesel generator that drives the high pressure core spray (HPCS) pump currently depends on cooling water supplied by pumps powered by the other two diesel generators during loss of offsite power conditions. The ACRS recommends that the merit of removing this dependency be examined.

GSU Position

GSU has examined the merit of a completely independent HPCS cooling water supply. The original design for supplying cooling water to the HPCS diesel (Standby Service Water (SSW) pumps powered by either the Division I or II diesels) met NRC Staff regulatory requirements and was the same design as reviewed at the CP stage. The concern expressed by the ACRS involves failure of both Division I and II diesels to operate (i.e. multiple failures which is beyond current NRC design requirements). For this postulated case, the HPCS diesel (Division III) would be denied cooling water and would not be operable.

To remove this dependency a design modification was undertaken which involved off loading one of four SSW pump motors, its associated discharge valve and pump cubicle cooling fan from the Division I diesel generator and adding this load to the HPCS diesel generator. In addition, Division III SSW initiation instrumentation was added and associated instrumentation and control hardware changes were made.

This design change will allow 50% of the long term (i.e. post RHR shutdown cooling initiation) SSW cooling water to be provided from the Division I diesel while the other 50% will be provided from the HPCS diesel generator. Division II remains unaltered and capable of supplying 100% of the required long term SSW cooling water. Single failure criterion for the diesels is satisfied in the following manner:

1. Loss of either the Division I or HPCS Division III diesels - 100% SSW cooling water supplied by Division II diesel.

2. Loss of the Division II diesel - 100% SSW cooling is supplied (50% from Division I and 50% from the HPCS Division III).

GSU notified the NRC staff of the HPCS modification via FSAR changes. This information was forwarded to the NRC via letter RBG-19576 dated 11/29/84 and was included in FSAR Amendment No. 16.

Item No. 2

GSU stated that they plan to conduct a limited probabilistic risk assessment (PRA) for the River Bend Station (RBS). The ACRS supports the proposal to perform a plant-specific PRA and recommends that it include seismic-and-fire-induced accident scenarios.

GSU Position

GSU is one of forty-two utilities participating in the "Seismicity Owner's Group" study entitled "Seismic Hazard Methodology for Eastern U.S.A." RBS is one of the nine reactor sites selected for computation pertaining to earthquakes. The RBS site is located in an area of low seismicity, well above the Mississippi River flood plain, over 100 miles from the nearest seacoast, and in an area of low or at most, average tornado activity. Preliminary figures and estimates indicate that the likelihood of an earthquake exceeding the design basis would be on the order of 10^{-4} to 10^{-5} per year. This is an order of magnitude or two lower than that anticipated for many sites. Since the frequency of occurrence of these events is extremely low and because of the extreme severity needed to generate major accidents from these initiators, omission of earthquakes as an external event is justified.

A study comparing fire induced accidents at RBS with the standard BWR-6 was conducted by the General Electric Company for GSU. The analysis was performed on the basis of fire protection measures described in FSAR Section 9.5.1, "Fire Protection System" and Appendix 9A, "Fire Protection Program Evaluation Report." The event and fault trees of the GESSAR II Nuclear Island Plant PRA were used to assess the impact of a particular fire in the plant systems and to estimate the core damage frequency initiated by the fire.

RBS meets NRC staff fire protection requirements, compares favorably with GESSAR II, and is significantly better than other PRA for plants of similar design. It is concluded that fire need not be considered further in PRA analysis.

In conclusion, GSU has performed Phase-2 of a limited PRA anaylsis of RBS. Phase-2 was based on Grand Gulf-1 event trees supplemented by RBS plant specific fault trees and site specific consequence analysis. In addition, fire induced accident scenarios were considered and RBS was compared with GESSAR-II and operating nuclear plants. Results of the limited PRA analyses, when compared to more detailed PRA's for other plants of similar design, indicate that the impact of internal and external initiating events can be predicted adequately and that additional PRA analysis is not warranted.

Item No. 3

Although River Bend is in a relatively quiet seismic portion of the country, NRC contractor estimates of the recurrence interval for the safe shutdown earthquake are similar to those for most eastern sites. The ACRS recommends that GSU review, in detail, the seismic capability of the emergency AC power supplies, the DC power supplies, and small components such as actuators, relays, and instrument lines that are part of the decay heat removal system.

GSU Position

GSU has completed an investigation of the equipment, instruments and supports for seismic capability.

Of the 141 pieces/17 types of equipment in the decay heat removal system, 21 pieces/8 types of equipment were sampled to determine each piece's seismic margin. Evaluation of calculational methodology including random sampling of actual support seismic margins were also conducted for instrument stands, instrument tube supports, cable tray supports and small bore pipe supports within the decay heat removal system and the AC and DC power supplies. The minimum margin of safety (i.e., seismic margin in excess of that required to meet our licensed .1g design basis ground acceleration) was 250%.

GSU believes the exhibited margins of safety are representative of the total population and that these margins are typical of the overall design.

This review demonstrates the conservatisms that exist in the seismic justification of equipment and supports. The conservatisms provide adequate assurance that the equipment and supporting structures will survive and remain functional during a seismic event.

Item No. 4

River Bend employs refrigerated charcoal beds in the offgas processing system for the main condenser. The ACRS requests that GSU provide an estimate of the offsite doses given the complete loss of refrigeration to the beds and the failure to manually isolate the offgas system from the main plant exhaust.

GSU Position

The calculated dose rates due to continuous noble gas releases from the main plant exhaust increase by a factor of approximately two due to loss of refrigeration to the charcoal beds. This assumes all other plant parameters remain constant. If refrigeration were lost for one month, the Restricted Area Boundary dose from noble gases would be approximately 0.12 mrad (gamma dose in air) and 0.1 mrad (beta dose in air).

Based on a comparison of these estimates to 10CFR50 Appendix I design objectives, we feel that a loss of refrigeration to the charcoal beds will not present any off-site radiological hazard.

Item No. 5

River Bend Station containment personnel and equipment hatches utilize inflatable seals. The ACRS expressed interest in: (1) length of time accumulators would be able to maintain air pressure to the seal in a post-accident situation given a specified leakage from the seals, and (2) recovery plans should one lose air pressure to the seals in a post-accident situation.

GSU Position

The only containment vessel hatches at RBS utilizing inflatable seals are the personnel air lock hatches. GSU has examined the personnel air lock inflatable seal design with respect to maintenance and recovery of air pressure to the seals in a post-accident situation.

The air lock is designed to hold the seal inflation pressure for a period of 35 days via an independent Category I auxiliary air supply self-contained within each door. The loss of plant air supply to the air locks in no way jeopardizes containment integrity for a period of 35 days.

Test data taken on the subject air lock seals indicate that air losses from the air lock seal system is less than half of the tech spec limit, required to maintain integrity of the air locks for 35 days.

Investigation of the air lines and isolation valves supplying the inflatable seals (two on each door) indicates that in the event of a loss of supply air during a post-accident situation an alternate air supply could be tied into the existing supply lines just outside the outer containment air lock. This alternate air supply could be a supply of bottled air or a portable compressor either of which could be installed in short time (1-2) days.

Item No. 6

The ACRS requests that it be provided the qualification program and data for River Bend's containment isolation valves for the 36 inch diameter containment purge and vent lines.

GSU Position

The valves in question are identified as follows:

MARK NUMBER	LOCATION/FUNCTION
1HVR*AOV123	Supply Line Inboard CIV
1HVR*AOV128	Exahust Line Inboard CIV
1HVR*AOV165	Supply line Outboard CIV
1HVR*AOV166	Exhaust Line Outboard CIV

The valves are 36 inch diameter high performance butterfly valves with air cylinder actuators manufactured by Posi-Seal International, Inc. (PSI). Each valve is designated by PSI as a 36" CLASS 150/150 WELD END VALVE. Each valve is furnished with a MATRYX fail-closed air cylinder actuator, Model No. 33122-SR80 (AOV123,128) or Model No. 45122-SR80 (AOV165,166).

GSU has specifically addressed the issue of qualification of these valves in our response to the NRC Staff's Branch Technical Position (BTP) 6-4 (reference letter RBG-19,385 dated November 8, 1984) with regard to the Drywell/Containment Purge System.

The 36 inch diameter containment isolation valves in the Containment Purge System are qualified to perform their intended function, including full closure upon the initiation of a combined LOCA and DBA seismic event.

Item No. 7

In the phase II work on the River Bend PRA, GSU plans to modify their PRA to include design consideration for ATWS. The ACRS requests that GSU provide their estimate of the failure rate for the recirculation pump trip logic. It is suggested that the results of the phase II PRA program be provided to the Committee.

GSU Position

The failure rate of the ATWS Recirculation Pump Trip (RPT) used in the Stone and Webster analysis is 3.8×10^{-4} per reactor year. This value compares favorably with the General Electric value of 6.3×10^{-4} per demand.

Item No. 8

Unit coolers are to be used at RBS instead of containment sprays to control temperature and pressure following an accident. Containment sprays have previously been cited as being very efficient in the removal of airborne radioiodine. To what degree can a unit cooler system be expected to remove airborne radioiodine or other materials?

GSU Position

The River Bend containment unit coolers remove airborne fission products by the same method as containment sprays, that is, by condensation. The River Bend unit coolers are designed to condense 100% of the steam that bypass the suppression pool, assuming no surface condensation.

The actual capability of the unit cooler to remove airborne fission products has not been assessed. This assessment is not necessary since the impact on further reducing the amount of fission products released would be minimal due to the effectiveness of pool scrubbing and condensation of water vapor from the atmosphere onto containment surfaces. This is supported by a GE performed analysis which considers postulated severe accidents with pool bypass, in which the bypass steam is condensed either on containment surfaces or by the unit cooler, and shows that this event would have negligible overall risk. Additionally, following the guideline of Regulatory Guide 1.3, River Bend LOCA analysis assumes that 50% of the iodine from an equilibrium core is released to primary containment and of this release, 50% of the iodine remains airborne. The remaining 50% is assumed to "plate-out" on containment surfaces. This analysis takes no credit for any fission product removal via condensation through the unit coolers. The resulting calculated exposures are well within 10CFR100 guidelines.

Thus, while inclusion of fission product removal by the RBS unit coolers would reduce the calculated fission product release, the impact on overall plant risk is minimal.

Item No. 9

GSU has proposed to include in the River Bend Emergency Procedures a procedure for venting the containment under certain accident conditions. The bases for the decision to take this action are not yet clear. The NRC Staff has not completed its review of this proposal. The ACRS wishes to be advised when the NRC Staff has reached a position on this matter and to have an opportunity to comment generically or specifically.

GSU Position

GSU has analyzed the containment response to the most probable sequence of events that would require decay heat removal through containment venting through presently existing systems. The transient analyzed will proceed slowly allowing significant operator action. If attempts to initiate and restore all design capabilities for decay heat removal are unsuccessful, the ultimate decision to vent will be made by the Emergency Director and as available, input from the NRC, state and local officials will also be taken into consideration.

Emergency Operating Procedures direct operator actions based on the symptoms and equipment available. Venting would be initiated through the Hydrogen Purge System or the Containment Ventilation System. This venting procedure would require opening the containment purge exhaust valves when containment pressure reaches 45 psig. This evaluation agrees with guidance given in the Emergency Procedure Guidelines (EPGs). The equipment and systems which would be used have been evaluated for their capability to perform as needed.

Item No. 10

The ACRS has not completed its review of hydrogen control for the River Bend Station, particularly as it may be impacted by differences in containment design features between River Bend and Mark III BWRs previously reviewed. The ACRS will complete its review of the full power operating license when the NRC Staff and GSU have made sufficient progress in resolving the matter of hydrogen control.

GSU Position

In accordance with the requirements of the final hydrogen control rule (10CFR50.44), GSU will have a hydrogen control system, supported by preliminary analysis, installed and operational prior to exceeding 5% power. A schedule for demonstrating full compliance with the final hydrogen control rule has been submitted to the NRC (reference letter RBG-21,389 dated June 26, 1985).

With respect to the final analysis required by the rule, the Hydrogen Control Owners Group (HCOG) submitted its Hydrogen Control Program Plan to the NRC Staff on December 14, 1984, as an attachment to HGN-024. GSU, as a member of HCOG, feels that the approach set forth in the Hydrogen Control Program Plan is a suitable program of research and analysis to demonstrate full compliance with the hydrogen control rule. This plan is currently under staff review. GSU will endorse this plan as applicable which will serve as an update of the RBS program plan. As the results of specific HCOG subtasks, activities and reports become available, GSU will address their individual applicability as necessary. The final RBS analysis will be completed with schedules consistent with the HCOG program.