March 24, 1988

Docket No. 50-458

Mr. James C. Deddens
Senior Vice President, (RBNG)
Gulf States Utilities
P. O. Box 220
St. Francisville, LA 70775
ATNN: Nuclear Licensing

Dear Mr. Deddens:

SUBJECT: MAIN STEAM TUNNEL TEMPERATURE ISOLATION ACTUATION INSTRUMENTATION SETPOINTS - RIVER BEND STATION, UNIT NO. 1

By letter dated June 5, 1987, Gulf States Utilities submitted an application for a license amendment. Attachment 2 to the application requests an increase in the main steam tunnel area temperature; Attachment 3 to the application requests changes to the Technical Specification values for the trip setpoints and allowable values of the main steam tunnel ambient and ventilation differential temperatures used for isolation of the main steam lines, RWCU and RCIC systems. The staff has completed a preliminary review of these attachments to your letter; our review of Attachment 1 is continuing. We have identified a set of questions based on our review of Attachments 2 and 3 that need clarification. We suggest that the enclosed questions (Enclosure 1) and the principal concerns identified in Enclosure 2 serve as the agenda for the meeting scheduled in Rockville on March 29, 1988. Formal responses to the questions are not required prior to the meeting; however, we request that your staff be prepared to respond to the enclosure. Most of the enclosed questions have evolved from telephone conversations with your staff. A copy of the enclosure was telecopied to your staff on this date.

Sincerely,
Original signed by

Walter A. Paulson, Project Manager
Project Directorate - IV
Division of Reactor Projects - III,
IV, V and Special Projects

Enclosure:
As stated

cc w/enclosure:
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Docket File	NRC PDR	Local PDR	PD4 Reading
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PD4/LA	PD4/PM	PD4/D
PNoonan	WPaulson:sr	JCalvo
03/24/88	03/24/88	03/24/88

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

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Enclosure 1

QUESTIONS
SUMMARY TABLE

1. General: Calculation and Validation of Steam Tunnel Temperatures

2. Main Steam Line Tunnel North

3. Main Steam Line Tunnel South

3A. Ventilation/Offsite Radiological Exposure Control During Normal Operation

4. Instrumentation & Control

5. Reactor Systems/Offsite Radiological Exposures During Transients & Accidents

6. Environmental Qualification

7. Structural

8. Pipe Line Inspection

9. Operating Procedures

10. Technical Specifications

11. Proposed Resolutions

1. GENERAL: CALCULATION AND VALIDATION OF STEAM TUNNEL TEMPERATURES FOR EACH OF MAIN STEAM LINE TUNNEL (MSLT) NORTH AND MSLT SOUTH:

1.1 Describe the physical model and related computational methods for calculating steam tunnel temperatures (average & recirculation delta Ts) and cooler condensate flow rates, without and with steam line and/or reactor cleanup (RWCU) system leakage.

1.2 List the important variables affecting these results e.g. MSLT heat load, service and chiller water temperature, normal ventilation air rates and related conditions (temp. & humidity), cooling capacity being utilized.

1.3 What values were used for these parameters in plant design and which gave, for example, 105°F average air temp for MSLT north.

1.4 How did the values for the operating plant change from expected design values.

1.5 Has the licensee found it necessary to prepare a revised physical model and computational method using the changed values (and parameters).

1.6 Has the licensee confirmed the results of his methodology, with change of seasonal conditions leading to increases in MSLT temperature. If so, how.

1.7 With his current methodology, how does the licensee expect tunnel temperatures and condensate flow rates to change with changes in seasonal and plant operating conditions.

1.7.1.2 Has the licensee confirmed his model for MSLT North against the seasonal conditions and plant operating conditions, including cooler capacity being utilized, for the circumstances of the special reports filed with the NRC under GSU correspondence Nos. RBG-24271 (8/28/86),

RBG-23302 (3/10/86), RBG-22779 (3/10/86), RBG-25976 (5/19/87) and RBG-26132 (6/18/1987).

1.7.1.3 What confirmation can the licensee provide for forecast temperatures in MSLT South.

1.8 What additional tests would the licensee propose to confirm validity of these computational methods through plant life.

1.9 Provide calculated values of MSLT temperatures and cooler condensate flow rates for steam leakage rates of 0 gpm, 5 gpm and 25 gpm, over the expected envelope of seasonal conditions, and plant operating conditions including cooler capacity being used.

1.10 Repeat the calculations of question 1.9 above replacing steam leakage rates with RWCU leakage rates of 5 gpm and 25 gpm.

1.11 Identify appropriate Procedural and T.S. values from these calculated values with summary description of related considerations.

2 MAIN STEAM LINE TUNNEL NORTH

2.1 Circulation Rate of Unit Cooler (-R)UC8. Licensee proposed 24,933 cfm whereas Figure 9.4-7 shows 15, 800 cfm.

2.2 Provide cooling capacity of Unit Cooler (-R)UC8.

2.3 How is cooling capacity of (-R)UC8 controlled.

2.4 Confirm or otherwise, absence of normal through ventilation for the tunnel.

2.5 Status of condensate drainage/collection system for (-R)UC8. Provide related P&IDs. Include any other drainage collection system for MSLT North.

2.6 Volume of MSLT North

2.7 How is cooling capacity controlled during plant operation in a manner consistent with the zero leakage condition, and the 5 gpm and 25 gpm setpoints.

2.8 For Instrumentation & Control requirements, reference section 4.

3 MAIN STEAM LINE TUNNEL SOUTH

3.1 Recirculation Cooler Unit HVR-UCII

3.1.1 Provide circulation rates for single fan and two fan operation.

3.1.2 Cooling capacity is given as 1425.5 mbh. Pleas clarify this unit.

3.1.3 Table 9.4-7 page 4 of 11 of USAR shows cooling medium as chilled water. This does not agree with verbal advice from licensee

3.1.4 Status of condensate drainage/collection system for (HVR-UCII). Provide related P&IDs. Include any other drainage collection system for MSLT South.

3.1.5 For Instrumentation & Control (I&C) requirements, reference section 4.

3.1.6 How is cooling capacity controlled. How is it varied during plant operations in a manner consistent with the zero leakage condition, and the 5 gpm and 25 gpm setpoints.

3.2 Recirculation Cooler Unit MR86-0003

3.2.1 Provide recirculation rate

3.2.2 Status of condensate drainage/collection system. Provide P&IDs.

3.2.3 How is cooler performance affected by plant service water temperature.

3.2.4 How is cooling capacity controlled.

3.2.5 For Instrumentation & Control requirements, reference section 4.

3.2.6 How is cooling capacity controlled during plant operations in a manner consistent with the zero leakage condition, and the 5 gpm and 25 gpm setpoints.

3.A VENTILATION/OFFSITE RADIOLOGICAL EXPOSURE CONTROL DURING "NORMAL" OPERATIONS

3.A.1 The following requirements relate to each of MSLT North and MSLT South.

3.A.2 Provide a definitive description of the "normal" ventilation system.

3.A.3 Provide a definitive description of any effective "containment" system, and/or effective fission product clean up system to prevent or mitigate the consequences of the following developing circumstances during and from normal operation:

- Normal operation with no coolant leakage into the MSLT
- Normal operation with 5 gpm steam or RWCU system leakage rate into the MSLT
- "Operation" up to 25 gpm steam or RWCU system leakage rate into the MSLT
- Operation up to any revised T.S. limits considered for leakage rates.

3.A.4 Reference section 4 for related I&C requirements

3.A.5 Evaluate increases in offsite exposure and their relevance to "allowable limits", for each of the developing situations in respect of increasing leakage outlined in question 3.A.3 above

4 INSTRUMENTATION AND CONTROL

4.1 MSL Tunnel North

4.1.1 Re UFSAR Fig 7.6-1. Does Div. 1 and 2 only isolate reactor core isolation cooling system (RCIC) whilst Divisions 1 2 3 & 4 isolate main steam isolation valves MSIVs.

Where is logic providing Isolation of reactor water cleanup system (RWCU) system

T.S. provides for isolation of MSIVs, RCIC & RWCU from these temperatures.

Please clarify.

4.1.2 Ensure that P&IDs provided for the cooler condensate drainage/collection system for unit cooler (- R)UC8 define the related Instrumentation & Control systems. Provide any related logic. Include any other drainage/collection system for MSLT North.

4.1.3 Provide information on protective logic to control offsite exposures from the normal through ventilation system during normal operation

4.2 MSL TUNNEL SOUTH

4.2.1 Provide information on T/Cs 132 and 133 on (HVR-UCII) on Fig. 94-46 in the UFSAR.

4.2.2 Is their a ΔT measurement on (HVR-UCII)

4.2.3 Provide information on temperature measuring systems on recirculation cooler (MR86-0003).

4.2.4 Clarify location of T.S. Temperature Instrument 2.h.1 on TS Table 3.3.3-2, Page 3/4 3-20 entitled Mainsteam Tunnel Area (el. 95°).

- Elevation 95' is on the floor of the turbine building well away from most of the MSLT South region in the Aux Building.

- This elevation of 95' also conflicts with licensee information that elevation of the instrument is 102 ft.

4.2.5 Clarify location of T.S. Temperature Instrument 2.h.2 on T.S. Table 3.3.3-2, Page 3/4 3-20 entitled Main Steam Tunnel (El.114').

- is this in MSLT South within the Aux. Building or is it in MSLT South in the Turbine Building.

- This elevation of 114' also conflicts with licensee information that elevation of the instrument is 128 ft.

4.2.6 MSLT South does not appear to provide for Isolation on temperature differentials in the recirculation ducts. Please clarify.

4.2.7 According to the T.Ss, Area Temp. in MSLT South isolates only MSIVs.

Why are not the RCIC and RWCU systems also isolated as those lines also penetrate beyond the jet impingement wall into this area. Reference UFSAR Page 6.2-24 4th paragraph.

4.2.8 Ensure that P&IPs provided for each of the cooler condensate/ collection drains in this area define the related instrumentation and control systems. Provide any related logic. Include any other collection/drainage system for MSLT South .

4.2.9 Provide information on protective logic to control offsite exposures from the normal through ventilation system during normal operation.

5 REACTOR SYSTEMS/OFFSITE RADIOLOGICAL EXPOSURES DURING TRANSIENTS & ACCIDENTS

5.1 During the events to be considered in the following sections, radioactivity can be released to the environment through both the pipeline break and from primary containment through the normal ventilation, and stand bye gas treatment (SBGT) systems. The relative importance of each type of release will vary with the event classification and its expected frequency in the licensing basis.

5.2 Provide the consequences of an Inadvertent High Temperature Trip in MSLT North with single failure of the HPCS system.

5.3 Provide the consequences of a high temperature trip in MSLT North four the current T.S basis leakage of 25 gpm, and a proposed revised value (of 32 gpm). Assume single failure of the HPCIS system.

5.4 Provide the consequence of an inadvertent high temperature trip in MSLT South with single failure in the HPCS system.

5.5 Provide the consequences of a high temperature trip in MSLT South for the current T.S. basis leakage of 25 gpm and a proposed revised value (of 32 gpm) for the following circumstances: (Assume single failure of HPCS system).

- The leakage is from the MSL system
- The leakage is from the RCIC/RHR steam line
- The leakage is from the RWCU system

5.6 Provide the primary reference for the subject 40 gpm total system leakage described in Attachment 3, Part 2, of the licensee submittal. Described its importance relevant to RCIC capacity.

Evaluate its importance for those events in which RCIC is initiated without prior isolation of the MS Lines. Clarify the 40 gpm in its relationship to the allowable leakage rates for the RCS and its interconnected systems through to the Main Turbine Stop Valves (and isolation valves of branched MSL systems). This will include a) those systems which are progressively isolated with reduction in Reactor Vessel water level and b) The SER record that limiting conditions for leakage outside containment are 25 gpm for identified and 5 gpm for unidentified.

Evaluate the acceptability of increasing MSLT leakage rates from 25 gpm to 32 gpm into each of MSLT North and MSLT South in respect of achieving a safe orderly shutdown for related significant events in section 15 of the USAR.

5.7 Include in your consideration of 5.6, the following events from the USAR:

- USAR Section 15.2.7 loss of all feedwater flow.

- USAR Section 15.6.6 feedwater line break outside containment.

6 ENVIRONMENTAL QUALIFICATION

6.1 The following requirements relate to each of MSLT North and MSLT South.

6.2 Provide environmental qualification information both identifying and addressing licensing basis information for:

- Safety related equipment

- Non safety grade equipment performing a safety related function and therefore important to safety

6.3 The information under 6.2 is to be evaluated for:

- Normal operation with zero leakage.
- Normal operation at 5 gpm leakage.
- "Operation" at 25 gpm leakage.
- "Operation" at a proposed revised value (of 32 gpm)
- MSL failure in the tunnel. (Provide the starting conditions used for assessing the related peak temperatures and pressures) this)

6.4 The information under 6.3 should be evaluated for the proposed revisions to the licensing basis

6.5 Describe the methods being used to requalify equipment for the more arduous conditions being proposed.

7 STRUCTURAL

7.1 For the MSL Break in each of MSLT North and MSLT South, evaluate the effect of any change in starting (temperature) conditions on the absolute pressures and pressure differentials calculated for the structure of the MSLT and its venting system, in the existing licensing basis.

8 PIPE LINE INSPECTION

8.1 Provide details of inspection procedures controlling walkdowns in MSLT North and MSLT South undertaken to inspect and identify a leak rate of 5 gpm in the Main Steam Line System, Main Steam Line Drainage System, RCIC/RHR Steam Supply System and the Reactor Water Cleanup System.

8.2 Provide bases for proposing that a 5 gpm leakage rate is detectable from the walkdown inspection.

8.3 Provide the information on the current status of the ISI program for the following systems in each of MSLT North and MSLT South:

Main Steam Line System
Main Steam Line Drainage System
RCIC/RHR Steam Supply System
Reactor Waste Clean Up Steam (RWCU)

9 OPERATING PROCEDURES (FOR EACH OF MSLT NORTH AND MSLT SOUTH)

9.1 Review and revise Operating and Emergency Operating Procedures for the 5 gpm leakage alarm and 25 gpm leakage Isolation Set Points.

10 TECHNICAL SPECIFICATIONS (FOR EACH OF MSLT NORTH AND MSLT SOUTH)

10.1 Review information and propose appropriate technical specifications with related Safety Evaluation Reports.

11 PROPOSED RESOLUTIONS

11.1 Short Term

11.2 Medium Term

11.3 Long Term

Enclosure 2

PRINCIPAL CONCERNS
SUMMARY

1.0 Establishing the Safety Bases for the 25 gpm steam leakage rate setpoint for isolation of multiple systems in the main steam line tunnels (MSLTs).

1.1 GE Recommendation of 25 gpm steam leakage: Basis effect of changing values in Section 15 Analyses

1.2 GE Total system leakage of 40 gpm: Clarification

2 Reactor Coolant Leakage of 5 gpm into the MSL Tunnels: Alarm Point for Procedural Action.

3 Consequences of Inadvertent High Temp Trips:

4 Radiological Exposures/Normal/Transient and Accident:

5 Leakage Detection Systems:

5.1 Temperature Measuring Systems

5.2 Condensate Collection/Drains Measuring System

5.3 Pipe Line (In Service) Inspection Program

6 Environmental Qualification (E.Q.)

7 Structures

PRINCIPAL CONCERNS

Nos. 1 through 7

1.0 Establishing the Safety Bases for the 25 gpm steam leakage rate setpoint for isolation of multiple systems in the main steam line tunnels (MSLTs).

1.1 In attachment 3 of his submittal, the licensee states:

> "The leak rate was based on the Nuclear Steam Supply System (NSSS) vendor, General Electric (GE), recommendation that the temperature trip setpoints be predicted on an equipment area temperature rise equivalent to a 25 gpm steam leakage rate for system isolation (ref. GE Design Specification Data Sheet 22A3735AF). The criterion for establishing the unidentified leakage rate of 25 gpm was based upon the makeup capability of the RCIC system and is independent of the feedwater system, normal a-c power, and the emergency core cooling systems. However, in the limiting transient for the RCIC system (Loss of Feedwater Transient), RCIC will be initiated on Reactor water level 2 and inject water into the RPV sufficient to assure that level 1 is not reached, even in conjunction with a total system leakage of approximately 40 gpm."

The setting of this leak rate appears to have a principal safety function of ensuring acceptable Licensing Basis responses to Section 15 Transients and Accidents. Any proposed increase must therefore be proposed by G.E. through the licensee and evaluated for acceptability for the related Section 15 Transients & Accidents by the NRC staff.

1.2 As part of 1.1 above, there is a need to clarify the principal components of the 25 gpm required by GE, the "total system leakage of approximately 40 gpm", and their relationship to the allowable leakage rates for the RCS and and its interconnected systems through to the Main Turbine Stop Valves (and isolation valves of branched MSL systems). This will include

those systems which are progressively isolated with reduction in water level in the Reactor Vessel. This clarification can only be made by GE through the licensee for assessment by staff.

There is also a need to clarify and evaluate, for consistency and appropriateness, the SER in which the licensee is recorded as having stated that, outside containment the limiting conditions for leakage are 25 gpm for identified and 5 gpm for unidentified.

1.3 General: Both the above Items 1.1 and 1.2 will require evaluation if the licensee proposes to increase the set point for Main Steam Line (and other systems) Isolation from the existing 25 gpm.

2 Reactor Coolant Leakage of 5 gpm into the MSL Tunnels: Alarm Point for Procedural Action.

The NRC has issued no SER on the set point for this alarm. Stable/unstable crack ratios and related margins to instability for carbon steel main steam lines (in the MS tunnels) have not been materially evaluated by the staff although presented by the licensee in his USAR.

The licensee should explain the importance of this alarm point to the facility and the procedural response by the plant to the alarm, and the safety basis for this.

The question should be addressed, irrespective of the proposed T.S.

3 Consequences of Inadvertent High Temp Trips:

Principle arguments for the provision of increased temperatures generally in the MSLT relate to potentially inadvertent trips. The inadvertent trip is currently different in its consequences for the MSLT North and MSLT South. MSLT North isolates RCIC, and with single failure for HPCS degenerates to a SB LOCA (bound by a Large Break LOCA). This can be much more severe than for MSLT South where only MSIV isolation occurs with RCIC remaining available. The total consequences are important in

judging licensees concerns, including safety, and identifying the best solution.

This will need to be addressed, even if the increased tunnel temperatures are not approved, as it can be influential in developing more suitable plant procedures to guard against the circumstances.

4 Radiological Exposures/Normal/Transient and Accident:

Radiological exposures and their expected frequency are principal measures of acceptability for amendment to the license.

Pending information from the licensee, reactor coolant/steam releases into MSLT North and MSLT South starting from Normal Operating Conditions, are essentially uncontrolled releases with potentially significant Offsite Exposures. Clarification is necessary to define appropriate constraints and for both steam (MSL systems) and water (RWCU system) leakages.

This will need review irrespective of any decision to increase allowable maximum leakage rate from 25 gpm to 33 gpm.

5 Leakage Detection Systems:

5.1 Temperature Measuring Systems

To verify the basis for the 0 and 5 gpm through 33 gpm temperature settings on the existing and proposed revised set points, model verification over changing seasonable and plant operating conditions (including variable cooler capacity and changing steam leakage rates) is necessary.

Presumption of an always zero leakage steam line is unacceptable when the first alarm setpoint is 5 gpm.

This review is necessary irrespective of the proposed T.S. as an additional cooler has been installed in MSLT South without apparently any revisions to the related TS.

This information will also facilitate review of necessarily revised procedures consequent upon alarms for these systems.

5.2 Condensate Collection/Drains Measuring Systems

Important for low level leak detection of 5 gpm as potential precursor to substantive corrective action on pipework of the RWCU, RCIC/RHR steam and MSL systems in MSLTs. With observed seasonal (and other) variations of MSLT temperatures, it is possibly the only reliable method on which to base a major corrective review and action. This was an element of the USAR wherein it was described as the only method with a measuring accuracy of 1 gpm and the most suitable for measuring 5 gpm.

This will need review irrespective of any decision to increase allowable maximum leakage rate from 25 gpm to 33 gpm.

5.3 Pipe Line (In Service) Inspection Program

This licensee is required to explain how a visual inspection by walkdown of the RWCU, RCIC and MSL systems in the MSLT is conducted to determine a crack size with a flow rate of (no greater than) 5 gpm of saturated liquid or steam, considering the apparent importance of this value as a signal for crack size requiring substantive corrective action to pipework.

This will need review irrespective of any decision to increase allowable maximum leakage rate from 25 gpm to 33 gpm.

6 Environmental Qualification (E.Q.)

There is virtually no summary information in the USAR on the principal elements of E.Q. under both normal abnormal and harsh environments.

EQ Under the harsh environment with appropriate MSLBs in each of MSLT North and MSLT South must be addressed. Increases in resulting harsh

temperature can occur with increases in starting normal temperature. Unless they are bound by the existing calculations, revised calculations will be necessary.

EQ under a given harsh environment is also dependent upon the prior normal operating temperature. Therefore, any proposed increase in these normal operating temperatures will impact EQ for the harsh environment, revised or otherwise.

7 Structures

Subcompartmental pressures and pressure differentials on MSL Break in each of MSLT North and MSLT South and their venting systems are calculated based upon starting temperatures in each of these tunnel regions. Any proposal to increase these starting temperatures therefore needs a re-evaluation of the related pressures and/related differentials against structural criteria for the facility.