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

December 21, 1984
RBG- 19,755
File Nos. G9.5,
G9.19.2

Mr. Harold 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

Gulf States Utilities Company (GSU) provides the enclosed response addressing the River Bend Station (RBS) Safety Evaluation Report (SER) Confirmatory Item No. (7) and the Nuclear Regulatory Commission's (NRC) letter dated September 27, 1984 from A. Schwencer to J. E. Booker. The NRC letter requested additional information regarding thermal expansion and building displacement stresses in piping supports.

The enclosed response describes the results of a comparison study performed to demonstrate that structural integrity is not compromised under the existing support design. The comparison study reviewed the calculated RBS stress values, based on the 1974 ASME III Code Subsection NF stress allowables, against the NRC Mechanical Engineering Branch Staff position. A sampling size was chosen to provide a confidence level greater than 99 percent. The study showed that no modifications of the existing supports would be required. Therefore, the design methodology employed for RBS component supports meets the Staff's position forwarded to GSU in the NRC's letter dated September 27, 1984

This concludes GSU's response to SER Confirmatory Item No. (7).

Sincerely,

J E Booker

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

JEB/RJK/je

Attachment

B001
1/1

8412310096 841221
PDR ADOCK 05000458
E PDR

ATTACHMENT

A comparison study was performed using the NRC Staff's position to assess the effect of classifying thermal and seismic anchor movement loads as primary loads on existing RBS pipe support designs to demonstrate that the structural integrity/safety of existing designs is not compromised.

The RBS FSAR states that component supports are in compliance with the 1974 Edition of the ASME III Code, including the Summer 1974 Addendum. This edition of the Code classified stresses caused by restraint of piping thermal expansion and anchor motions as secondary stresses and exempts them from being considered for Emergency and Faulted Conditions. Component supports designed for RBS are in full compliance with the FSAR and the ASME Code. The following is the basis for this position:

- Paragraph NF-3213.10 states that "Free End Displacements consist of the relative motions that would occur between an attachment and connected structure or equipment if the two members are separated. Examples of such motions are those that would occur because of relative thermal expansion of piping, equipment and equipment supports or because of rotations imposed upon the equipment by sources other than the piping."

  This classifies thermal expansion (piping) and anchor movements as free end displacements.

- Paragraph NF-3213.11 states that "Expansion stresses are those stresses resulting from restraint of free end displacement of the piping system."

  This defines stresses produced by the restraint of thermal expansion and anchor movement loads (from piping) as expansion stresses.

- Paragraphs NF-3231.1 (b) and (c) state explicitly that constrained free end displacements and differential support motion effects need not be considered for Emergency and Faulted Conditions.

The ASME III Code used the principle of elastic shake down as the basis for classifying thermal expansion and anchor movement stresses as secondary stresses. In addition, NRC Regulatory Guide 1.124 addresses the use of higher allowable stresses to accommodate elastic shakedown.

The NRC-MEB staff position on the classification of stresses would result in higher calculated stresses for most service conditions, and the NRC's position is identical to that of the 1983 Edition of the ASME Code. However, the 1983 Edition of the ASME Code Subsection NF also permits higher allowable stresses than the earlier editions.

The following QA Category I systems were conservatively selected due to their high operating temperature and thermal expansion and seismic anchor movement loads to the Upset Condition greater than or equal to 0.3.

- o Main Steam System
- o Residual Heat Removal System
- o Feedwater System
- o Reactor Water Cleanup System
- o Service Water Systems
- o Safety Valve Vents
- c Low Pressure Core Spray
- o Spent Fuel Cooling System

The pipe sizes vary between 2-in. NPS and 24-in. NPS.

There are approximately 3,100 QA Category I supports at RBS, and these systems represent 2,200 pipe supports. Anchors, restraints, and struts are the only supports designed to restrain thermal expansion and anchor movement loads. There are 1,580 anchors, restraints, and struts included in this sample. The remaining supports (620) are spring hangers and snubbers which do not restrain thermal expansion loads.

Two hundred and fifty (250) supports were randomly selected for this study. The sampling size is well above the normal sampling requirements of MIL-STD-105D. These 250 supports were reviewed and 60 supports were judged to require additional evaluation for the increased design loads due to their high thermal load ratios. These 60 supports were then evaluated in more detail and reduced to 22 supports to be reanalyzed. The reanalyses were performed using thermal expansion and seismic anchor movement loads in plant service levels, A-Normal, B-Upset, C-Emergency and D-Faulted.

The sampling used in this study provides a confidence level greater than 99 percent.

Results

The results of the comparison study indicate that redefining thermal expansion and anchor movement loads as primary loads per the 1983 Edition ASME Code Subsection NF would not require physical modification of the existing support designs, even if the allowable stresses are maintained at the present levels of the 1974 Code. Therefore, the design methodology employed for RBS components supports meets the Staff position forwarded to GSU in the NRC's letter dated September 27, 1984. Since the study provides a high degree of confidence that modification to the RBS design would not be required, no benefit or improvement to the public health & safety would be realized by a complete reanalyses.