Docket No. 50-458

SEP 27 1984

Mr. William J. Cahill, Jr.
Senior Vice President
River Bend Nuclear Group
Gulf States Utilities Company
Post Office Box 2951
Beaumont, Texas 77704
ATTN: Mr. J. E. Booker

Dear Mr. Cahill:

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION - RIVER BEND STATION SUPPORT DESIGN

As a part of the staff's review of your application for an operating license for River Bend Station, the staff has determined the need for additional information with regard to the design methodology for component supports. The request for information and staff position with regard to pipe stresses in design analyses is included in the enclosure.

Please inform NRC Project Manager Edward Weinkam of you schedule for response and for clarification or further discussion of this topic.

A. Schwencer, Chief
Licensing Branch No. 2
Division of Licensing

Enclosure: As Stated

cc: See next page

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River Bend Station

Mr. William J. Cahill, Jr.
Senior Vice President
River Bend Nuclear Group
Gulf States Utilities Company
Post Office Box 2951
Beaumont, Texas 77704
ATTN: Mr. J. E. Booker

cc: Troy B. Conner, Jr., Esq.
Conner and Wetterhahn
1747 Pennsylvania Avenue, N. W.
Washington, D.C. 20006

Mr. William J. Reed, Jr.
Director - Nuclear Licensing
Gulf States Utilities Company
Post Office Box 2951
Beaumont, Texas 77704

H. Anne Plettinger
712 Carol Marie Drive
Baton Rouge, Louisiana 70806

Richard M. Troy, Jr., Esq.
Assistant Attorney General in Charge
State of Louisiana Department of Justice
234 Loyola Avenue
New Orleans, Louisiana, 70112

Dwight D. Chamberlain
Resident Inspector
Post Office Box 1051
St. Francisville, Louisiana 70775

Gretchen R. Rothschild
Louisianians for Safe Energy, Inc.
1659 Glenmore Avenue
Baton Rouge, Louisiana 70775

James W. Pierce, Jr., Esq.
P. O. Box 23571
Baton Rouge, Louisiana 70893

Ms. Linda B. Watkins/Mr. Steven Irving
Attorney at Law
355 Napoleon Street
Baton Rouge, Louisiana 70802

Mr. David Zaloudek
Nuclear Energy Division
Louisiana Department of
Environmental Quality
Post Office Box 14690
Baton Rouge, Louisiana 70898

Mr. J. David McNeill, III
Assistant Attorney General,
State of Louisiana
Department of Justice
Lands & National Resources Division
7434 Perkins Road
Baton Rouge, Louisiana 70808

In Section 3.9.3.3 of the River Bend SER (NUREG-0989 dated May 1984), the staff identified a confirmatory item regarding the categorization of constraint of free end displacement stresses in component supports. In the ASME Code Section III Subsection NF (1974), constraint of thermal expansion and building displacement stresses in piping supports are treated as secondary stresses. The applicant's position is consistent with the 1974 ASME and is presented in a letter from J. E. Booker to A. Schwencer dated December 19, 1983. The staff has completed its review of the applicant's position and our evaluation follows.

The staff's position with respect to pipe stresses in analyses is that piping thermal stress is treated as a secondary stress. Piping thermal stress is that stress which occurs from restraining the free end deflection of piping due to temperature increase or decrease. Piping thermal stress is characterized as a secondary stress whether the piping is analyzed by Article 3200 of Subsection NB of Section III of the ASME Code or by the more simplified and generally used approach of Article NB/NC/ND 3600 of the Code. However, within the limits of reinforcement for Class 1, 2 or 3 vessel nozzles (nozzle-piping transition), restraint of free end displacement of the attached pipe is considered a primary stress by the Code and this treatment is concurred in by the staff.

For piping and the pipe-nozzle transition region of a component such as a vessel, the staff has accepted and uses Section III of the ASME Code to characterize the stress which results from the restraint of free end displacement of piping as primary for nozzles within the area of reinforcement, or as secondary for piping.

Prior to the issuance of Subsection NF in 1973, the AISC Code (Manual of Steel Construction) was used exclusively for support design with the exception of component standard supports. Even now the AISC Code continues to be used for the design of either a portion of, or the complete structural load path, of a piping or component support. The AISC Code does not characterize loads as primary or secondary. All loads including those due to piping thermal expansion are evaluated. When Subsection NF of the Code was first issued in 1973 and then in the 1974, 1977 and 1980 editions of the Code, the staff did not categorically accept the characterization of restraint of piping thermal expansion as a secondary load for support design. Secondary loads including restraint of free end displacements due to piping thermal expansion and seismic differential building movements are accounted for in the normal and upset conditions but were not required to be evaluated for the emergency and faulted conditions by ASME in the above mentioned versions of Subsection NF based on the assumption that their effect is usually small. Thermal stresses or other "secondary" effects are not explicitly discussed in the AISC design instructions. However items meeting the AISC specification must be designed so that stresses which result from all sources are at least within specified allowable values. Unless these loads are evaluated, or their effects are otherwise limited, such as by stipulating a maximum value for support strain, there is no assurance that the support will not fail due to gross plastic deformation or that the deformation will not affect the operability of supported components. To

disregard such effects simply because a standard allows the practice is not considered acceptable for a safety system. Many utilities and design agents have continued to use the AISC philosophy in ASME support designs even after the publication of Subsection NF to assure supported component operability, and that gross plastic deformtion will not occur. They characterize the support stresses which result from the restraint of piping thermal expansion and seismic anchor point motion as primary, even though not previously required by the ASME Code. In the 1983 Edition of the ASME Code, Subsection NF was revised to recognize such concerns by requiring stresses induced in the support by restraint of free and displacement and anchor point motion of piping to be characterized as primary.

Subsection NF in the 1973 version, and in all later editions including the present, does not require the evaluation of stresses which result from the restraint of thermal expansion of the support itself. The staff has accepted this provision, requiring an evaluation only in those unusual cases where long constrained support lengths subject to large temperature changes might collapse or otherwise be appreciably stressed.

In summary, the staff position on supports has not changed since the early 1970's and while it once could be characterized as "going beyond the Code" due to the need to preclude gross plastic deformation and the need to assure operability of components (consideration of operability is specifically excluded in the Code scope), this characterization is no longer valid. Further, the staff position conforms to those requirements necessary to meet GDC 1, 2 and 4.

The staff requires the applicant to provide the basis for assuring that its design methodology for component supports as presented in its December 19, 1983 letter meets the above staff position. We will report our findings in a later supplement to the SER.