GULF STATES UTILITIES COMPANY

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

AREA CODE 504 635-6094 346-8651

June 13, 1985
RBG- 21288
File Nos. G9.5, G15.4.1

Mr. Robert D. Martin, Regional Administrator
U. S. Nuclear Regulatory Commission
Region IV
611 Ryan Plaza Drive, Suite 1000
Arlington, Texas 76011

Dear Mr. Martin:

River Bend Station - Unit 1
Refer to: Region IV
Docket No. 50-458/Report 85-40

This is in response to the Notice of Violations contained in NRC I&E Inspection Report No. 50-458/85-40. The inspection was performed by Mr. W. M. McNeill during the period April 15-19 and April 29 - May 3, 1985, of activities authorized by NRC Construction Permit CPPR-145 for River Bend Station Unit No. 1.

Gulf States Utilities Company's (GSU) response to the Notice of Violations 85-40-01, "High Strength Steel Bolts Preload," and 85-40-02, "Inspection Records," is provided in the enclosed attachment. This completes GSU's response to the Notice of Violations.

Sincerely,

W. J. Cahill, Jr.
Senior Vice President
River Bend Nuclear Group

WJC/PJD/PEF/TFP/TCC/amg

Attachment

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ATTACHMENT

June 23, 1985
RBG-21288

Response to Notice of Violations

Reference

Notice of Violations - E. H. Johnson letter to W. J. Cahill, dated May 28, 1985.

Refer to Docket 50-458/85-40.

Response to 85-40-01 High Strength Steel Bolts Preload

The NRC selected sample of 7/8" diameter bolts were inspected at River Bend Station (RBS) using job inspection torque (JIT), which was developed at the time this lot of bolts was installed. Of these 200 bolts, only 8 failed to achieve JIT and recorded a residual torque approximately 95 percent to 50 percent of JIT. This demonstrated that 96 percent of the sample size at least met or exceeded the JIT.

We believe that the results of the torque testing of the bolts by the NRC indicate satisfactory bolt installation, as required to meet the design conditions. The following are the bases for this conclusion:

a) Installation and inspection of bolts were performed in accordance with the Research Council for Riveted and Bolted Structural Joints (RCRBSJ), which requires an inspection of 10 percent of the bolts of every connection with a minimum of two bolts per connection selected at random. This inspection is intended to provide assurance that the connection has been properly tightened. (Note: The inspection sampling frequency is not intended to detect every bolt that may exist below the JIT, but rather to lend confidence that the connection was installed properly, since the two bolts inspected in a connection showed compliance). Therefore, the existence of eight bolts that failed to meet JIT out of 200 bolts total is consistent with industry standards.

b) JIT is the average torque measured in the testing of three bolts in a lot. Industry test on torque tension relationship shows that bolts from the same lot yielded an extreme value of bolt tension 30 percent from the mean tension desired. The average variation was in general 10 percent. As a result, bolts that have 70 percent of the JIT could provide the minimum fastener tension.

c) Friction connections installed in accordance with RCRBSJ specification give a minimum factor of safety of 1.52 against slip for full capacity of connection in accordance with the AISC seventh edition. Also, the eighth edition recognizes the higher friction coefficient of roughened galvanized surfaces, which adds approximately 20 percent to the safety

margin. This essentially provides a bolt tension approximately 80 percent higher than that required by design.

d) Due to high stress levels in the threaded part of the installed bolts, some relaxation in pretension will occur. Relaxation tests in the industry indicate approximately 4-percent loss in bolt tension after 21 days. Relaxation of assemblies of galvanized plates and bolts, such as those used at RBS, can be twice the value of plain bolts and connected materials. Relaxation in pretension will result in a lower torque measurement. Therefore, for some of the bolts that exhibited marginally lower torque values, this lower torque may have been caused predominantly by relaxation.

The minimum fastener tension specified by the AISC code is required only for the design of friction connections. Conservatively, all the connections at the RBS have been designated as friction type. In an unlikely event that friction would be overcome, the connection would act as a bearing connection. Performance of bearing connections is not dependent on high bolt pretension.

It should be noted that connection holes are nominally 1/16 in. larger than the bolt diameter. Therefore, the maximum slip that can occur in a joint is equal to 1/8 in. However, the joint movements are rarely as large as 1/8 in. and average less than 1/32 in. according to industry experience. In many situation, the joint will not slip at all under live loads because the joint is often in bearing by the time the bolts are tightened. This occurs due to small misalignments inherent to the fabrication process or due to slip occurring under the dead load before the bolts in joint are tightened. Therefore, torque has insignificant affect on the stability of the structure.

River Bend structural connection design utilizes A325 bolts in the majority of applications. THe AISC allowable shear values for friction connection are the same as allowables for connection in bearing. For higher strength bolts, the allowable bearing capacity is slightly higher than that for friction connection. Therefore, if the connection results in bearing connection, the design capacity is not compromised. It should be noted that the performance of bearing connections is not dependent on the high bolt pretension.

Based on the above, we believe we have been and continue to be in full compliance with specification and RCRBSJ requirements.

Corrective Steps Which Have Been Taken and Results Achieved

Not Applicable.

Corrective Steps Which Will Be Taken To Avoid Further Violations

Not Applicable.

Date When Full Compliance Was Achieved

Not Applicable.

Response to 85-40-02 Inspection Records

Corrective Steps Which Have Been Taken and Results Achieved

With regard to insufficient records for structural inspection activities, the following information addresses the examples cited in the Inspection Report.

1. A Type "c" unsatisfactory Inspection Report (IR) S5620026 was initiated to document the inaccuracies found on the markup drawings and the H.S. Bolting Records for inspection reports generated in 1980, 1981 and 1982.

2. A 100% review of High Strength Bolting (HSB) IR's was performed for the IR's written by the six inspectors involved in deficiencies of the sample. Deficiencies disclosed by this review were corrected on those IR's which had not been transmitted to Permanent Plant File (PPF). For deficient IR's already transmitted to PPF, new HSB IR's were prepared and attached to the programmatic Type "c" unsat IR.

3. Documentation verification for the other twenty structural inspectors was conducted by sampling in accordance with Quality Assurance Directive (QAD) 7.11. Deficiencies detected were corrected as above, however, all twenty samples met the acceptance level of the sampling plan.

Verification was performed by comparing the HSB IR's to both the Bristol Steel drawings and a physical inspection of the erected connection.

Corrective Steps Which Will Be Taken To Avoid Further Violations

The six inspectors involved in item 3.b (100% review) are no longer employed in the F.Q.C. structural steel discipline. Additionally, training was conducted on QS 10.17-RB Rev. A, Structural Steel Erection, with special emphasis on sections 7.1 "Inspection" and 7.2 "Records". All inspectors currently assigned to the structural steel discipline attended this training.

Date When Full Compliance Was Achieved

Full compliance was achieved by June 10, 1985.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

STATE OF LOUISIANA	§	
PARISH OF WEST FELICIANA	§	
In the Matter of	§	**Docket Nos. 50-458**
		50-459
GULF STATES UTILITIES COMPANY	§	

(River Bend Station,
Unit 1)

AFFIDAVIT

W. J. Cahill, Jr., being duly sworn, states that he is a Vice President of Gulf States Utilities Company; that he is authorized on the part of said Company to sign and file with the Nuclear Regulatory Commission the documents attached hereto; and that all such documents are true and correct to the best of his knowledge, information and belief.

W. J. Cahill

W. J. Cahill, Jr.

Subscribed and sworn to before me, a Notary Public in and for the State and Parish above named, this 13 day of June, 1985.

Joan W. Middlebrooks

Joan W. Middlebrooks
Notary Public in and for
West Feliciana Parish,
Louisiana

My Commission is for Life.