

U. S. NUCLEAR REGULATORY COMMISSION  
OFFICE OF INSPECTION AND ENFORCEMENT

REGION IV

Report No. 50-458/80-07

Docket No. 50-458

Category A2

Licensee: Gulf States Utilities  
Post Office Box 2951  
Beaumont, Texas 77704

Facility Name: River Bend, Unit No. 1

Inspection at: River Bend Site

Inspection Conducted: July 15-18, 1980

Inspectors: *A. B. Beach*  
A. B. Beach, Reactor Inspector, Engineering Support  
Section (Paragraphs 1, 2, 3, 4.b, 5 & 6)

8/8/80  
Date

*J. I. Tapia*  
J. I. Tapia, Reactor Inspector, Engineering Support  
Section (Paragraph 4.a)

8/8/80  
Date

Other Accompanying  
Personnel: J. L. Zachery, Engineering Aide (Co-op)

Reviewed by: *W. A. Crossman*  
W. A. Crossman, Reactor Inspector, Projects Section

8/14/80  
Date

Approved: *W. A. Crossman*  
W. A. Crossman, Chief, Projects Section

8/14/80  
Date

*R. E. Hall*  
R. E. Hall, Chief, Engineering Support Section

8/14/80  
Date

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Inspection Summary:

Inspection on July 15-18, 1980 (Report No. 50-458/80-07)

Areas Inspected: Routine, unannounced inspection of concrete placement activities; housekeeping; and the review of records relating to safety-related structural steel. The inspection involved fifty-six hours by two NRC inspectors.

Results: In the areas inspected, no items of noncompliance were found in one area. One apparent item of noncompliance was found in the area of housekeeping (infraction - failure to follow procedural requirements for good housekeeping - paragraph 3) and one apparent item of noncompliance was found in the area of concrete placement activities (deficiency - inappropriate accept/reject criteria for total air content in an exterior wall placement - paragraph 4.b). Two apparent deviations were also found in the area of concrete placement activities (deviation - hot weather concreting - paragraph 4.a.(1) and deviation - concrete placement - paragraph 4.a.(2)).

## DETAILS

### 1. Persons Contacted

#### Principal Licensee Employees

- \*T. C. Crouse, Director Quality Assurance (QA)
- \*M. A. Dreher, Public Affairs
- \*J. R. Dungenberg, Assistant Superintendent, Site Construction
- \*P. D. Graham, QA Engineer
- \*K. C. Hodges, QA Engineer
- I. Hormozi, Construction
- \*J. W. Leavins, Engineering
- J. Hudson, QA Engineering Supervisor
- R. B. Stafford, Supervisor QA Systems
- W. S. Stuart, QA Engineer
- J. E. Wimberly, Superintendent, Site Construction

#### Other Personnel (Stone and Webster)

- J. D. Anderson, Field Quality Control (FQC) Lab Supervisor
- \*J. G. Borden, QA Engineer
- \*K. E. Conrad, FQC, Senior Site Representative
- A. J. Lossu, Superintendent of Engineering
- A. Kamdor, Resident Engineer
- \*W. I. Clifford, Resident Manager
- \*J. E. Roskoph, Assistant Superintendent of Engineering
- \*R. L. Spence, Superintendent, FQC
- \*D. L. Wells, FQC Inspector Supervisor

#### Other Personnel (National Mobile Concrete)

- R. C. Wheeler, QA Site Manager

The IE inspector also talked with and interviewed other licensee employees and contractor personnel including members of the QA/QC and engineering staffs.

\*Denotes those attending the exit interview.

### 2. Licensee Action on Previous Inspection Findings

(Closed) Unresolved Item (50-458/80-04): Use of the Dywidag Reinforcing System in Category II and Category III Structures. The ordering and receipt of this material has been approved for Category II and Category III structures since proper controls have been established.

This item is considered closed.

(Closed) Noncompliance (50-458/79-06): Deletion of and Failure to Specify Acceptance Criteria. At the time of this inspection, low alkali cement is still being used at the site, and the potential reactivity of the aggregate used is within the ASTM C33 specification limits, thus eliminating the noncompliance to a "for information only" requirement. Also, the IE inspector verified E&DCR C-248 changed the specification to reflect appropriate compressive strength accept/reject criteria.

This item is considered closed.

(Closed) Noncompliance (50-458/79-06): Failure to Identify Unsatisfactory Test Results and Follow Construction Specifications. A review of inspection reports indicated that the 45% retention between sieves is now being identified when not meeting specification requirements. In addition, Mortar Bar test results are within the ASTM C33 limits.

This item is considered closed.

### 3. Site Tour

The IE inspectors conducted a tour of the River Bend site to observe construction activities in progress. During a tour of the Reactor Building and the Control Building, it was observed that housekeeping practices were not being maintained as required. A large amount of trash and debris was observed on the floor of the Reactor Building, including in and around the Reactor Pedestal area. Paper cups and cans littered scaffolding erected near formwork in the vicinity of concrete placement activities. Certain unsanitary conditions observed indicated that approved toilet facilities were not being utilized.

In the Control Building, waste collection containers were filled to overflowing. Recessed floor areas beneath structural steel columns had accumulated stagnant water. This water contained chicken bones and other eating litter, attracting insects.

Construction Methods Procedure, CMP 1.4-11.75, "Housekeeping," in Section 3.15, requires that locations of eating places be designated so that littering of paper and garbage can be controlled. Waste containers for litter and garbage are to be provided in these areas.

Section 3.1.7 of this same procedure requires that waste be collected as frequently as necessary to maintain a clean work area. Section 3.4.1 establishes that work areas should be kept sufficiently clean so that construction activity can proceed in an efficient manner. Yet, no housekeeping activities were observed by the IE inspectors during this inspection.

In addition, Section 3.4.1 of CMP 1.4-11.75 states, "that where large accumulations of materials occur, such as the stripping of concrete forms, promptly remove the material or store it neatly." During this same tour, the IE inspectors observed concrete forms removed from the Diesel Generator Building stored haphazardly on top of the reinforcing steel to be used in the shield walls of the Reactor Building.

From these conditions observed, this is considered to be an item of noncompliance with Criterion V of Appendix B to 10 CFR 50, specifically, failure to follow procedural requirements for good housekeeping.

4. Concrete Placement Activities

a. Observation of Work Activities

(1) Hot Weather Concreting

The IE inspectors observed portions of the following concrete placements:

- (a) Placement No. ET-15-W-94J6-1; 22 cubic yards in the Electrical Tunnel wall
- (b) Placement No. DG-5-W-94C1-2; 56 cubic yards in a Diesel Generator Building wall

Both placements were accomplished by pumping; the Diesel Generator Building wall by means of a boom truck, and the Electrical Tunnel wall via a rigid pipeline approximately 300 feet long. The inspectors' observations specifically addressed the placement of the concrete in a continuous and uninterrupted manner and proper consolidation to assure a monolithic structure.

During the placement of the Electrical Tunnel wall, the IE inspector observed plugging of the pipeline and excessive slump loss at the pipeline discharge. An analysis by the IE inspector was initiated to determine the probable causes leading to the condition which resulted in these concrete placement difficulties.

A review of the Stone & Webster Quality Assurance Concrete Placement Inspection Report indicated the following batching and placing attributes:

- (a) Clear weather with ambient air temperature ranging from 98 to 101 degrees F.
- (b) Two slump tests performed at the pump showing a 3 inch loss each.
- (c) One air content test performed at the pump showing 3.5 percent air.
- (d) The placement consisted of 2 cubic yards of grout and four truck loads of 5 cubic yards each.
- (e) Highest concrete temperature recorded at the pump was 69 degrees F.

- (f) Total water withheld for the four truck loads was 39 gallons, while only one load was retempered with 4 gallons.
- (g) Air entraining admixture batched remained a constant 25 ounces.

A review was also performed of the applicable design specification and Preliminary Safety Analysis Report (PSAR) requirements which would be applicable during hot weather concreting. PSAR, Section 3.8.4.6, "Materials, Quality Control, and Special Construction Techniques," requires that workmanship conform to ACI 305-72, "Recommended Practice for Hot Weather Concreting." Section 5.2, "Inspection" of ACI 305-72, states that "Inspectors should record at frequent intervals air temperature, concrete temperature, general weather conditions, wind velocity, and relative humidity." It further states that, "The record should include frequent checks on temperatures of concrete as delivered and after placing in the forms, and observations on the performance and appearance of the concrete as delivered and after placing in the forms . . . . All such data should be identified with the work in progress so that conditions surrounding the construction of any part of the structure can be determined if necessary at a later date. A copy of all these observations should be included in the permanent project records."

Contrary to the above commitments, the inspection record did not contain the wind velocity, relative humidity, temperature of the concrete as placed, nor the observations on the performance and appearance of the concrete as placed. This is a deviation from ACI 305-72.

(2) Concrete Placement

The IE inspector also compared the batching and placing controls in use with those recommended by ACI 305-72 and with standard industry practice. This comparison includes attendance by the IE inspector at the preplacement meeting held the day prior to the observed concrete placements. During this meeting, discussions did not include consideration of the effects of the hot weather on the pumpability of the concrete. Subsequent discussions with cognizant QC personnel indicated that concrete temperatures as placed were not expected to exceed 75 degrees F, based on past performance, and therefore no specific preparations for placing, other than use of ice, were considered. The reference to past performance could not be defined to point of identifying a placing condition similar to the one observed by the IE inspector.

Observations made by the IE inspector in regard to possible contributing factors which adversely affected the workability of the concrete are as follows:

- (a) Lack of protection of the long, exposed pipeline by covering with wet burlap to offset excessive slump loss.
- (b) Failure to consider the loss of slump and air content due to the length of pipe.
- (c) Failure to test for slump and air content at point of placement. (Specification requirements for testing frequency were met since the entire placement fell within the 50 cubic yard cycle.)
- (d) Concern with meeting the specification requirement for maximum slump of 3 inches at truck discharge while totally disregarding the effect of pumping.
- (e) Failure of the batch plant to adjust the air entraining admixture for the purpose of increasing workability after the first load indicated an air content of 3.5 percent, the minimum allowable. Maximum allowable air content is 6.5 percent.

These conditions demonstrate inadequate placement planning, improper reason for and use of testing results, and overly conservative batching. These items represent a deviation from standard industry practices as recommended in ACI 304-73, "Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete," and with ACI 305-72, "Recommended Practice for Hot Weather Concreting." ACI 304-59 (sic-73) is referenced in the River Bend PSAR, Section 3.8.4.6, "Materials, Quality Control, and Special Construction Techniques."

b. Review of Quality Assurance Records

The IE inspectors reviewed concrete placement records relative to total air content limits. During this review, the IE inspectors noted that the "Concrete Pour Card/Checklist" for placement DG-4-W-94A1 indicated the total air content limits to be 0% - 6½%. However, a portion of this placement was an exterior wall placement. Air entrainment limits for exterior walls are 3½% - 6½% by Stone and Webster Specification 210.350, "Specification for Mixing and Delivering Concrete." E&DCR C-75 allows "that the lower limit of air content may be reduced to zero percent for concrete batched for interior use or for concrete placed two feet or more below finish grade."

The actual total air content values were in the range of 3.6% - 4.6% which is within the appropriate accept/reject criteria of 3.5% - 6.5% for an exterior wall placement. FQC inspection personnel assured the IE inspector that they were aware that a portion of this placement was for an exterior wall and, by their inspection plan, identified that the air content limits had to be within 3.5% - 6.5%. However,

the amount of air entrainment admixture added to the concrete mix is relatively similar to the amount used in the same concrete mix where the total air content limit had previously fallen below 3.5% as indicated in the review of similar placement records. Thus, the use of the inadequate accept/reject criteria is considered to be an item of noncompliance with Appendix B to 10 CFR 50; i.e., specifically, failure to identify appropriate acceptance criteria.

Aggregate gradation tests results for the fine aggregate used during the period March 20 to June 10, 1980, were also reviewed. Forty-five randomly selected Fine Aggregate Test Report forms were specifically reviewed. The IE inspector verified, that, for the four tests showing 61 percent passing the No. 30 sieve, the average of that test and the previous nine tests was below the 60 percent maximum allowable. This method of obtaining a running average is specified in Stone & Webster Specification No. 210.361, December 17, 1979, "Concrete Testing Services."

5. Structural Steel

The IE inspector reviewed Stone and Webster Construction Specification 210.310, "Specification for Structural Steel." This specification establishes the installation and inspection requirements for safety-related structural steel at the site. Subsequently, the Stone and Webster Inspection Plan R1-210.310-001, Rev. 4, "Structural Steel," was reviewed.

No items of noncompliance or deviations were identified during this review.

6. Exit Interview

The IE inspectors met with the licensee and contractor representatives (denoted in paragraph 1) at the conclusion of the inspection on July 18, 1980. The scope and findings of the inspection were summarized by the IE inspectors.