

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

REGION IV

Report No. 50-498/81-03; 50-499/81-03

Docket No. 50-498; 50-499

Category A2

Licensee: Houston Lighting and Power Company  
Post Office Box 1700  
Houston, Texas 77001

Facility Name: South Texas Project, Units 1 and 2

Inspection at: South Texas Project, Matagorda County, Texas

Inspection Conducted: January 19-23, 1981

Inspectors: *W. J. Huback* 2/11/81  
for J. I. Tapia, Reactor Inspector, Engineering Support Section Date  
(Paragraphs 1, 2, 3, 4 & 5)

*W. J. Huback* 2/11/81  
for L. D. Gilbert, Reactor Inspector, Engineering Support Section Date  
(Paragraphs 1, 3 & 5)

Other  
Accompanying  
Personnel: W. A. Crossman, Chief, Projects Section

Approved: *W. A. Crossman* 2/11/81  
W. A. Crossman, Chief, Projects Section Date

*for W. A. Crossman* 2/11/81  
R. E. Hall, Chief, Engineering Support Section Date

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Inspection Summary

Inspection on January 19-23, 1981 (Report No. 50-498/81-03; 50-499/81-03)

Areas Inspected: Routine, unannounced inspection of construction activities including follow up on items of noncompliance, unresolved items, and Show Cause Order items. The inspection involved fifty-four inspector-hours by two NRC inspectors.

Results: No violations or deviations were identified.

## DETAILS

### 1. Persons Contacted

#### Principal Licensee Employees

- \*R. A. Frazar, Manager, Quality Assurance
- \*R. A. Carvel, Project QA Supervisor - Civil
- \*L. D. Wilson, Project QA Supervisor - Welding
- R. J. Viens, Senior QA Specialist
- G. W. Steinmann, Lead Site Engineer - Civil
- \*T. J. Jordan, Supervisor, Quality Systems

#### Other Personnel

- \*W. J. Friedrich, Project QA Manager, Management Analysis Company (MAC)
- L. M. Campbell, Senior Project Engineer, Woodward-Clyde Consultants
- \*R. L. Hand, Project QA General Supervisor, MAC
- B. C. Pettersson, Lead Geotechnical Engineer, Brown & Root (B&R)
- J. L. Ruud, Supervisor, Civil QA Engineering, MAC
- G. Y. Yeisley, Civil QA Engineer, MAC
- \*F. G. Miller, Project Welding Engineer, B&R
- D. Eller, Piping General Foreman, B&R
- \*D. J. Harris, Manager of Quality Engineering, B&R
- L. A. Weigel, Level III Inspector, US Testing
- \*G. L. Hall, Quality Engineering Coordinator, B&R

The IE inspectors also contacted other licensee and contractor employees including members of the QA/QC and engineering staffs.

\*Denotes those attending the exit interview.

### 2. Licensee Action on Show Cause Order Commitments

During this inspection, the following unresolved item identified in IE Investigation Report No. 50-498/79-19; 50-499/79-19 was reviewed:

(Closed) Unresolved Item (50-498/79-19-25; 50-499/79-19-25):  
Decrease in relative density of compacted material in wet state under vibration. Maximum density tests were conducted by Mr. C. K. Chan of the University of California, using both the wet and dry methods. The results are presented in the Independent Review Committee's "Interim Report to Brown & Root, Inc. on Adequacy of Category I Structural Backfill," dated July 12, 1980. The maximum density determined by the wet method was shown to be less than that of the dry method. The Independent Review Committee's "Status Report on Adequacy of Category I Structural Backfill," dated October 24, 1980, further addresses the validity

of the maximum-minimum densities obtained by Pittsburgh Testing Laboratory for use on site. The Committee has determined that the maximum density, as determined by the wet method, is not as satisfactory as the dry method for purposes of quality control testing. A review of the technical justifications presented in the status report has resulted in concurrence with the Committee's analysis that the maximum density values, as determined by the dry method, are valid.

This item is closed.

3. Licensee Action on Show Cause Order Commitments

- a. The IE inspector reviewed implementation of the commitments in the licensee's response to the Show Cause Order by discussions with licensee and contractor representatives and by review of commitments described in the attachment to HL&P letter ST-HL-AE-533, dated September 18, 1980. The following commitments, utilizing the identification numbers in the attachment to the HL&P letter, were reviewed:

(Closed) Item A26: The Task Force has completed a tabulation of density test with depth in the backfill placements and field verification of lift thickness in accessible areas. During this inspection, the IE inspector discussed the field verification performed on site with the Woodward-Clyde Consultant (WCC) Project Engineer. The tabulation of density test with depth was addressed in the observation of the backfill mapping being performed under the direction of the WCC Project Engineer.

(Closed) Item A32: The Independent Review Committee has reviewed all pertinent aspects of the structural backfill design studies, specification criteria, construction procedures and inspection and testing documentation. The Committee has submitted the following two reports, which address the listed backfill attributes that assure satisfactory design:

"Interim Report to Brown & Root, Inc. on Adequacy of Category I Structural Backfill," dated July 12, 1980

"Status Report to Brown & Root, Inc. on Adequacy of Category I Structural Backfill," dated October 24, 1980

The final response to the Show Cause Order will incorporate both reports in a format which will address all aspects of the backfill adequacy.

(Closed) Item A91: Unresolved concerns will be addressed either in the normal course of the review or through special investigation. The "Status Report" by the Task Force on Concrete Verification, dated August 15, 1980, was reviewed by the IE inspector. Page 11 of the report documents the Committee's "Review of Additional Concerns." This review includes NRC, HL&P and B&R

audits to determine any unresolved concerns. This review will be performed for all structures addressed in the Show Cause Order response.

(Closed) Item A93: UT testing of concrete has found one discrepancy (appears to be due to surface condition) which is being further investigated and is expected to be resolved shortly. During this inspection, the IE inspector inspected the area involved. The surface had been chipped out to sound concrete. A vertical core hole through the slab showed a homogeneous concrete structure.

(Closed) Items A94, A95, A96, A97, A98, A99 and A100: To assure all documentation has been performed, all test reports, batch plant records, pour cards, inspection reports, drawings, DCNs, FREAs, NCRs and CARs, which pertain to selected placements, are being reviewed and evaluated as to their correctness and completeness. As presented in the "Status Report by the Task Force on Concrete Verification," Phase 1 of the Task Force effort involved a Documentation Evaluation. A review of the information presented in the report satisfies the commitments.

(Closed) Items A101, A102 and A103: As designed documents are being evaluated..., the as-built inspection program consists of obtaining field measurements...., Once the asbuilt condition is documented, it will be compared to the as-designed condition. During this inspection, the comparison drawings for all selected placements in the Unit 1 Fuel Handling Building were reviewed. Discrepancies between the as-designed and as-built conditions were noted on the drawings that will be referenced in the Show Cause Order response.

(Closed) Item A104: Visual inspection is being performed .... Phase 3 of the Task Force effort involves visual inspection. Documentation of this review for the Unit 1 Reactor Containment Building was presented in the "Status Report."

(Closed) Item A105: Destructive tests should be performed to verify the sonic test results. During this inspection, a review was conducted of the "Plot of Test Sections," which show the core hole locations and the corresponding sonic reference point locations and velocities.

(Closed) Item A106: The cognizant design engineer is to review and approve the location of core holes with regard to potential of cutting reinforcing steel. During the coring process, verbal approval was required from the area engineer prior to coring. For the total coring program, 116 cores were obtained and only 3 reinforcing bars were cut. These bars were determined to be excess bars which would not harm the integrity of the structure if cut.

(Closed) Item A107: The Consultants Panel is to visually examine every core obtained to evaluate the quality of consolidation and uniformity of the concrete. The results of the visual examination of the cores taken in the Unit 1 Reactor Containment Building are presented in the "Status Report by the Task Force on Concrete Verification." This examination will be presented for each selected placement reviewed in the Show Cause Order response.

(Closed) Items A108 and A109: The Consultants Panel is to direct the drilling of probe holes and visually examine the holes .... Selected cores, in addition to visual examination, are to be examined using petrography. The results of the petrographic examination of samples drilled in the Unit 1, RCB are presented as Exhibit D in the "Status Report by the Task Force on Concrete Verification." All structures included in the Concrete Verification Program will be petrographically examined.

(Closed) Item A110: The Consultants Panel is to address previous unresolved concerns and allegations by visually inspecting such areas and recommending specific tests where such methods would resolve specific concerns or allegations. See closure of Show Cause Commitment A91, this report.

(Closed) Item A111: The sonic correlations and reference standard are being developed on the sample area utilizing cores or bore holes where possible. See closure of Show Cause Commitment A105, this report.

(Closed) Item M7: The Independent Review Committee has evaluated the field and laboratory data and has presented conclusions in the interim report. Final evaluation will be presented in a comprehensive report upon conclusion of all planned studies related to Category I structural and backfill. The "Interim Report on the Adequacy of Category I Structural Backfill," was issued on October 24, 1980. The final report is forthcoming.

(Closed) Item M12: A comprehensive evaluation is being performed. See AR, Section 2.5.4. During this inspection, the IE inspector discussed the method of the ongoing evaluation with the Lead Geotechnical Engineer in charge of the effort. The results of the review will be presented in the response to the Show Cause Order.

(Closed) Item M14: A complete review of Earthwork Inspection Reports is being performed to further verify compliance with the construction and inspection requirements. This review has been completed and will be presented in the response to the Show Cause Order.

(Closed) Item M19: The Task Force (safety-related concrete structures) will establish the schedule on any repair work. Discussions with the Lead Site Engineer - Civil indicate that only one repair has been performed. It involved a minor surface sand pocket at a construction joint. The repair has been performed.

(Closed) Items M20, M21, M22 and M25: Reviews for the RCBs, MEABs and FHBs will be accomplished. These reviews have been completed and are being documented for presentation in the response to the Show Cause Order.

(Closed) Item H17: Check qualifications of construction personnel. The resumes of the construction foremen in charge of complex concrete placements were reviewed by the IE inspector. The licensee has also performed a more comprehensive review encompassing other crafts. This commitment is satisfied in the civil area.

(Closed) Item H21: Final report to be available regarding the work of the Independent Review Committee in the soils area. The Review Committee has published two reports and is finalizing the comprehensive report to be submitted as part of the response to the Show Cause Order.

(Closed) Item H22: Complete mapping of the backfill construction activities. See closure of Show Cause Commitment A26, this report.

- b. (Open) Show Cause Order Item (3)(a): A review shall be made of the safety-related work described below, completed as of the date of this Order to determine whether such work was properly performed. If repairs are required, describe the extent of the repairs necessary and the schedule for completion. Also, describe the manner in which the review was completed and extent of the review.

The IE inspector reviewed implementation of the commitments in the licensee's response to this Show Cause Order item by discussions with licensee and contractor representatives and by inspection of objective evidence related to commitments described in the attachment to HL&P letter ST-HL-AE-533, dated September 18, 1980.

The following commitments, utilizing the identification numbers in the attachment to the HL&P letter, were reviewed:

(Open) Item A36: The Weld Review Program has been documented in TRD 5A700GP004. The TRD will be updated periodically to incorporate changes in the results of the program. The IE inspector reviewed the updated report on the review of safety-related welding which was incorporated into TRD

5A700GP004-B/PCN2. This item will remain open pending issuance and review of a final report by the special Task Force.

(Closed) Item A41: Further review is required of previous QA procedures and training manuals containing requirements for personnel qualifications.

B&R has issued the following new QA procedures with an effective date of January 26, 1981, for training and certifying QA personnel:

ST-QAP-2.1, "Quality Assurance Personnel Development"

ST-QAP-2.2, "Quality Assurance Personnel Training"

ST-QAP-2.3, "Site Quality Assurance and Quality Control Inspector Certification"

ST-QAP-2.4, "Auditor Certification"

ST-QAP-2.5, "Vendor Surveillance Specialist Certification"

ST-QAP-2.6, "Site Subcontractor Surveillance Specialist Certification"

The IE inspector selectively reviewed procedures ST-QAP-2.1, -2.2 and -2.3 and found them to be consistent with Regulatory Guide 1.58, Revision 0 in the areas inspected.

(Closed) Item A42: In addition, the Level III Program of Certifications and NDE Examinations are being reviewed. The Level III Program of Certifications and NDE Examinations have been incorporated into the new QA procedures listed in Item A41 and appear to be consistent with Regulatory Guide 1.58, Revision 0.

(Closed) Item A59: The system for controlling distribution of the filler metal will be reviewed for code and specification compliance. The IE inspector inspected the site fabrication shop for implementation of procedure MECP-8 requirements for control of welding materials. In the areas inspected, implementation was found to be consistent with the procedural requirements.

(Open) Item A70: The engineering specifications and construction procedures have been reviewed for consistency and compliance with PSAR/FSAR. The IE inspector was informed that the issuance of the final report has been delayed until February 1981. This item will remain open pending issuance and review of the final report.



- c. (Closed) The licensee's response to the Order to Show Cause, dated July 28, 1980, lists, on page 10, thirteen steps for the gradual restarting of ASME welding.

The IE inspector reviewed the objective evidence related to completion of each step. The status, indicated by the word open or closed, and the results of each step are provided below:

(Closed) Step 1: The IE inspector reviewed six welding procedure specifications (WPSs) applicable to the welding of stainless steel ASME materials. The WPSs have been revised to include a reference to B&R memorandum correspondence No. BC-31218 which provides supplemental heat input limits during welding of stainless steel materials. The six WPSs reviewed were:

WPS-2012, Revision 5, ICN 2

WPS-2014, Revision 2, ICN 1

WPS-2015, Revision 1, ICN 1

WPS-2024, Revision 2, ICN 1

WPS-2034, Revision 3, ICN 2

WPS-2072, Revision 0, ICN 1

(Closed) Step 6: Review, revision and reissuance of NDE procedures where necessary. This step is closed based on closure of Show Cause Commitments Item A39 and A67 in IE Inspection Report No. 50-498/80-38; 50-499/80-38.

(Closed) Step 10: Reconfirmation of qualification records of selected inspectors. This step is closed based on closure of Show Cause Commitment Item A40 in IE Inspection Report No. 50-498/80-38; 50-499/80-38.

(Closed) Step 11: Resumption of ASME welding, using these requalified welders and certified inspectors, on work selected under the following two categories:

- (1) Fabrication and welding in the site fabrication shop.  
Typical work would included:

.. socket welding small bore pipe spools (all Classes)

.. butt welding large bore piping up to 3/4" wall thickness (Class 3 only)

.. fabricating hangers and pipe supports per ASME, Subsection NF

- (2) Components Cooling Water System in the Unit 1 Mechanical Electrical Auxiliary Building, Cube 3J (ASME Class 3, Carbon Steel, approximately 35 butt welds).

The IE inspector observed four ASME welds made in the site fabrication shop for the Unit 1 Chemical and Volume Control System. The following shop welds and associated documentation were inspected: Weld Numbers 0001, 0003, 0005 and 0007 on Line No. CV1115-BB2, Sheet A2, Revision 1A of Drawing No. 2M361P-CV1115-BB2.

In the areas of welder qualification, weld and inspection documentation, procedure compliance, inspector certification, welder surveillance and filler metal control; no discrepancies were noted.

(Closed) Step 12: Review by certified Level III inspectors of the work in step 11 above for conformance with requirements. The IE inspector interviewed the US Testing Level III inspector contracted to review the ASME Welding Restart Program. The Level III inspector concluded, from his evaluation of ASME welding accomplished to date, that the work was progressing satisfactorily and was in conformance with requirements.

(Closed) Step 13: After the process described in the above steps has been satisfactorily demonstrated, the ASME welding program will be expanded into other plant areas as additional personnel are qualified.

The preceding 12 steps have been satisfactorily completed and expansion of ASME welding into other plant areas has been authorized by Immediate Action Letter, dated January 5, 1981.

#### 4. Concrete Placement

A portion of concrete placement No. ME2-W010-03 was observed by the IE inspector during this inspection. Specific attention was given to the constructor's conformance with Section 8.6.10, "Cold Weather Concreting," of Quality/Concrete Construction Procedure No. A040KPCCP-25, Revision 4. It was determined that cold weather concreting practices were in effect and that the temperature of the concrete was above the minimum allowed by the procedure. Consolidation of the concrete was also observed and found to conform to the procedural requirements. Curing of the concrete was addressed the following day by direct observation of the techniques used to maintain the surface temperature of the in-place concrete above the required 50 degrees F. This was accomplished through the use of an enclosure and space heaters. The observed moist curing and weather protection were found to be in accordance with Section 8.8, "Concrete Curing and Protection," of the aforementioned procedure.

By letter, dated January 8, 1981, the licensee requested a limited restart of complex concrete placement. Attachment I to the letter defines the scope of work as seven specific placements by number. The review of corrective actions taken by the licensee, as of the date of the request, resulted in concurrence with the request for a limited restart of complex concrete.

The first scheduled placement (No. CI2-W24) consists of the Unit 2 RCB north valve room walls and an adjoining portion of the secondary shield wall. During this inspection, the IE inspector toured the formed placement and observed the state of cleanliness, the general layout of the tremies, the arrangement of the lighting, the weather protection, and the provisions for the prevention of voids beneath blockouts. All observations were consistent with standard nuclear industry practices for the successful placement of concrete.

No violations or deviations were identified during this portion of the inspection.

5. Exit Interview

The IE inspectors met with licensee representatives (denoted in paragraph 1) on January 23, 1981. The IE inspectors summarized the purpose and the scope of the inspection and the findings.