

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

Report No. 99900502/80-01

Program No. 51200

Company: Brown and Root, Incorporated
Power Engineering
4100 Clinton Drive
Post Office Box 3
Houston, Texas 77001

Inspection Conducted: February 11-15, 1980

Inspector:

D. G. Anderson
D. G. Anderson, Principal Inspector
Program Evaluation Section
Vendor Inspection Branch

3/17/80
Date

D F Fox

D. F. Fox, Contractor Inspector
Program Evaluation Section
Vendor Inspection Branch

3/18/80
Date

J m Johnson
J. M. Johnson, Contractor Inspector
Program Evaluation Section
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3/19/80
Date

Approved by:

C J Hale
C. J. Hale, Chief
Program Evaluation Section
Vendor Inspection Branch

3-25-80
Date

Summary

Inspection on February 11-15, 1980 (99900502/80-01)

Areas Inspected: Implementation of Title 10 CFR 50, Appendix B, including followup on previous inspection findings, design interfaces, audits, and followup on two (2) 50.55(e) reports. The inspection involved one-hundred and two (102) inspector-hours on site by three (3) USNRC inspectors.

Results: In the four (4) areas inspected, four (4) deviations from commitment and one (1) unresolved item were identified in three (3) of the areas.

Deviations: Followup on Previous Inspection Findings: Corrective action addressed in a Brown and Root response to a previous deviation had not been completed as scheduled (See Notice of Deviation, Item A). Audits: (1) Audits were not conducted by qualified personnel, audit reports were issued without approval, checklists for audits were not retained, notification was not made for delinquent responses, audit reports did not identify persons contacted, audit reports were not issued on time, and a Management Audit Report did not identify persons contacted (See Notice of Deviation, Items B.1 through B.6). (2) Certification and documentation records for audit and supplier surveillance personnel were not maintained. (See Notice of Deviation, Items C.1, through C.6); (3) South Texas Project Engineering Procedures Manual did not contain the required pages (See Notice of Deviation, Item D).

Unresolved Items: Design Interfaces: It could not be determined if a design change for personnel airlock seals had been reviewed by NRR (See Details Section I, paragraph C.3.).

DETAILS SECTION I

(Prepared by D. G. Anderson)

A. Persons Contacted

Brown and Root, Inc.

F. M. Attar, Assistant Structural Project Engineer
E. T. Booc, Engineer
F. G. Burford, Assistant Discipline Engineer
T. N. Chan, Engineer
H. S. Cameron, Discipline Project Structural Engineer
*J. R. Geurts, Project General Manager
*A. H. Geisler, Manager, Nuclear Licensing
G. Z. Girgis, Project Stress Analysis Engineer
J. W. Grimes, Assistant Discipline Project Engineer
G. S. Jolly, Project Engineer
*P. S. Jordan, Project Licensing Engineer
E. W. Leschber, Senior Mechanical Project Engineer
*G. S. Millas, Senior Assistant Engineering Project Manager
*B. F. Mitchell, Project Quality Engineer
*J. E. Paden, Manager, Engineering Quality and Documentation
L. Patel, Engineering Supervisor
*R. W. Peverley, Assistant Engineering Project Manager
G. W. Smith, Mechanical Discipline Project Engineer
J. Tchiuraru, Assistant Project Structural Engineer
D. T. Watkins, Assistant Supervisor, Engineering Document Control Center
M. D. Willett, Mechanical Engineer
J. C. Younger, Structural Engineer

Houston Lighting and Power Company

*R. R. Hernandez, Lead Project Civil Engineer
C. T. Howell, Supervising Engineer
B. P. Wilkerson, Civil-Structural Team Leader

*Indicates attendance at the exit meeting.

B. Action on Previous Inspection Findings

1. (Open) Deviation (Report No. 79-03): References for design input parameters were not identified in the text of a system design description (SDD). Subsequent to this inspection, Brown and Root identified ten (10) additional SDDs which did not have references in the text for design input. Brown and Root's letters of response dated October 11, 1979, and November 8, 1979, set November 30, 1979, as the final date on which all corrective action would be completed on this item. As of the end of Inspection 80-01, February 15, 1980,

corrective action had been completed on only five (5) of the eleven (11) SDDs. This item has been identified as a deviation from Brown and Root commitments (See Notice of Deviation, Item A).

C. Design Interfaces

1. Objectives

The objectives of this area of the inspection for both internal and external interfaces were to determine that procedures have been established and implemented that:

- a. Require that design organizations identify, in writing, their interfaces for managing the flow of design information.
- b. Define and document the responsibilities of each organizational unit for the preparation, review, approval, distribution, and revision of documents involving design interfaces.
- c. Establish methods for systematically communicating needed design information, including changes thereto, across design interfaces as work progresses.
- d. Require documentation of the information transmitted between organizations which identified the status of the design information or documents incomplete items which require further evaluation, review or approval.
- e. Require that design information transmitted orally or by other informal means is promptly documented, and the documentation confirmed and controlled.
- f. Identify the external organizations providing criteria, designs, specifications, and technical direction.
- g. Identify the positions and titles of key personnel in the communications channel and their responsibilities for decision making, problem resolution, providing and reviewing information.

2. Method of Accomplishment

The preceding objectives were accomplished by an examination of:

- a. Preliminary Safety Analysis Report, South Texas Project, Units 1 and 2, Volume 13, Chapter 17.1.3.B.

- b. Quality Assurance Manual, Section 3.9, Design Interface.
- c. STP-GR-002-D, Project Engineering Organization, Section 4.0, Interfaces, 10/9/78. This procedure establishes the organizational structure at Brown and Root, Inc., for internal and external design interface control. The interface responsibility for the South Texas Project is assigned to the various Discipline Project Engineers with Table 1 and Table 2 to the procedure providing the detailed matrix for each interface responsibility.
- d. STP-GR-003-D, Design Quality Program, Section 2.2.3.4, Control of Design Interfaces, 1/29/79, describes the Project Engineering chain for design interface responsibility on the South Texas Project. Preliminary design information is transmitted verbally or orally and documented on STP Form 200.30, Telephone and Conversation Reporting, or by informal memorandum. Final design information is transmitted formally in design documents such as System Design Descriptions, Engineering Drawings, Specifications, reports, etc., and design interfaces are identified by the Discipline Project Engineer on STP Form 200.22, Routing and Distribution.
- e. The inspector examined the following documents to assure that the design interface activity on the South Texas Project is being accomplished according to procedures:

Engineering Design Deficiencies:

- EDD 78-54, GM-38111, Safety Injection System CCS, Pump A, including Calculation 2N129RC012C, Stress Calculation, 9/7/78.
- EDD 78-57, GM-38408, Personnel Airlock Design Deficiency, 9/14/78.
- EDD-78-59, GM-40429, Design Error and Verification Error, 10/25/78.
- EDD 79-28, GM-49368, Control Room Heating, Ventillation and Air Conditioning, including System Design Description 5V110VD002-C, 6/11/79.
- EDD 79-21, GM-47306, Containment Airlock Seal Design Deficiencies, 4/24/79.
- EDD 79-24, GM-48137, ECW Gantry Crane does not meet requirements for tornado loads, including Specification 7P200NS061-D, 5/10/79.

EDD 79-39, GM-53210, Containment Emergency Sump Safety Injection
Recirculation Line Deficiencies, 9/10/79.

EDD 79-112, GM-58310, Containment Mechanical Penetration Sleeve
Calculation, including calculation 2C099NC048C,
12/10/79.

EDD 80-59, GM58370, HHSI, LHSI, and CS Pump Discharge Sleeves
Overstressed According to Containment Penetration
Specification, 1/30/80.

The inspector noted that as of February 12, 1980, a total of
three hundred and thirty two (332) Engineering Design Defi-
ciencies have been identified and processed according to STP-
DC-021-C, Engineering Design Deficiencies.

This procedure provides the mechanism by which deficiencies in
design are referred to the Incident Review Committee for report-
ability under 10 CFR Part 21 and 10 CFR 50.55(e). The inspector
reviewed the following meeting minutes of the Incident Review
Committee to assure that those items which are referred to the
committee have been previously evaluated:

STQ-5280, 12/3/79
STQ-5119, 11/9/79
STQ-5060, 10/19/79
STQ-5006, 10/19/79
STQ-5003, 10/15/79
STQ-4968, 10/11/79
STQ-4730, 9/6/79
STQ-4696, 9/5/79
STQ-4679, 8/31/79
79-NL-221, 8/29/79
STQ-4246, 6/18/79
GM-49583, 6/11/79
STQ-4125, 5/21/79
STQ-4106, 5/18/79
STQ-4092, 5/15/79
GM-47199, 4/20/79
STQ-3931, 3/29/79
STQ-3724, 2/9/79
STQ-3715, 2/5/79
GM-41710, 12/5/78
STQ-3288, 9/26/78
GM-31403, 3/8/78
GM-31412, 3/8/78

3. Findings

In this area of the inspection, no deviations from commitment were identified. The following unresolved item was identified:

Personnel Airlock Inflatable Seal VS. Compression Seal Design

In reviewing EDD 79-21, the inspector noted that an engineer at Brown and Root, Inc., had questioned the design of the seals for the personnel airlock on the South Texas Project, Units 1 and 2. Further investigation revealed that the seals were different in design than those in present operating plants. In particular, previous seal design is such that during LOCA conditions, pressure from within containment compresses the seals on personnel airlocks. For South Texas, a redundant air supply system is required to maintain the integrity of the containment. To quote EDD 79-21, "This design is inconsistent with the design philosophy of other containment penetrations . . . it is not fail safe in its isolated condition." The inspector followed up on this item and determined that the utility had requested this type of airlock be designed as an operational convenience for transporting equipment into and out of containment. The inspector also determined that the South Texas Project FSAR, Volume 6, Section 3.8.2.1.2, Personnel and Auxiliary Airlocks, does not contain sufficient information to alert NRR to the fact that this is a major change in the design of personnel airlocks. In discussions with Brown and Root personnel, the inspector was advised that this design may also be generic to the Grand Gulf Project. This item will be transmitted to NRR for their review and evaluation.

The inspector reviewed the following documents related to this unresolved item:

- a. GM-47255, Personnel Airlock Design Deficiency, transmitted EDD 79-21 4/23/79.
- b. GM-47306, EDD 79-21, transmitted EDD 79-21 to Engineering for evaluation, 4/24/79.
- c. GM-49912, EDD 79-21, Engineering response to EDD 79-21, 6/21/79.
- d. GM-52947, EDD 79-21, Quality Engineering Acceptance of Response, 9/4/79.
- e. Drawing numbers 73-1PLA-01 through 73-1PLA-36, Personnel Airlock STP-Unit 1, Serial #1073-1, 8/2/76, W. J. Wooley Company.

- f. C269XR780BPD, Stress Report-Containment Personnel Airlock, 2/12/79.
- g. Specification 2C269SS006-G, Containment Liner, Section 2.4.3.1, Personnel Airlock, 7/25/78.
- h. Transmittals: ST-BR-HL-27820, 12/28/79.
ST-HL-BR-4386, 10/2/79.
ST-HL-BR-4180, 6/25/79.
ST-PD-BR-1329 and 1335, 3/21/79 and 3/22/79,
Wooley recommended that the design be changed
to the compression seal design.

D. Inadequate Support of Safety Injection Recirculation Line

The objective of this area of the inspection was to follow up on a 10 CFR 50.55(e) report which had been initiated by Brown and Root, Inc., and reported by Houston Lighting and Power Company for the South Texas Project. This particular item involves the containment emergency sump liner and the stresses placed on this liner by welding the guard pipe and process line piping directly to this liner. The piping system involved is the ECCS pump suction for trains A, B, and C for both South Texas Project Units 1 and 2. The deficiency which resulted from welding both lines directly to the liner becomes a safety concern during a postulated seismic event, which would result in failure of the welds and subsequent imposition of loads on the recirculation valve. These loads could cause the valve to fail and could cause a common mode failure of the ECCS suction for all three trains in both units. In effect, these failures could impair the capability of the ECCS to mitigate the consequences of a LOCA. In reviewing this report, the inspector assured that the following objectives were accomplished:

1. Objectives

- a. Determination of how this item was identified.
- b. That followup actions were conducted under the requirements and procedures of the Brown and Root Quality Assurance Program.
- c. Determining of the status of corrective action and preventive action to assure that this item is satisfactorily resolved.
- d. Determination of the generic effects on other plants and notification of the affected utilities.
- e. Determination of the accuracy and timeliness of reporting to the NRC.

2. Method of Accomplishment

The inspector reviewed the following documentation related to this reportable event to assure that the above noted objectives had been accomplished:

- a. Procedure STP-DC-021-C, Engineering Design Deficiencies (EDD) and STP-PMO-022, Procedure for Evaluating and Reporting of Defects, Noncompliances and Deficiencies.
- b. This item was identified during a drawing review at Brown and Root and processed as a Design Deficiency, EDD 79-39, Containment Emergency Sump Safety Injection Recirculation Line Deficiencies, 9/10/79.
- c. Corrective action is in progress and includes attachment of a metal bellows to the ends of the process piping and reanalysis of the liner/guard pipe forces. The inspector reviewed the following documentation with respect to this corrective action:
 - (1) First Interim Report, Safety Injection System Piping Deficiency, 11/13/79.
 - (2) GM-59452, Meeting Minutes South Texas Project CR-0241, 1/8/80.
 - (3) GM-59904, ECCS Pump Suction Trains A, B, and C, including Calculation 2N129RC004-B, Load of Anchor in Containment Wall, 1/20/80.
 - (4) GM-60239, Stiffness Data for Expansion Joints, 1/25/80.
 - (5) GM-60744, Stiffness Data for New Expansion Joints, 2/5/80.
 - (6) SUPERPIPE, Dynamic Pipe Stress Analysis Computer Code, including the following computer runs:

Calculation 2N129RC004, Static and Dynamic Pipe Stress Analysis/Safety Injection and Containment Spray System Suction, dated 2/1/80 and 2/5/80.

Isometric Drawing 1-R-0300E, Stress ISO ECCS Pump Suction Trains A, B, and C, 7/26/78.

3. Findings

In this area of the inspection, no deviations from commitment or unresolved items were identified.

Inadequate Support of Safety Injection Recirculation Line

This item was reported by Houston Lighting and Power Company in accordance with the requirements of 10 CFR 50.55(e) on October 25, 1979, and is generic only to South Texas Project, Units 1 and 2. Preventative action for this item included a review of all containment mechanical penetration sleeves on South Texas Project, Units 1 and 2, to assure that loads would not be exceeded during a seismic event.

E. Exit Meeting

An exit meeting was conducted with Brown and Root management personnel at the conclusion of the inspection on February 15, 1980. Those individuals indicated by an asterisk in the Details Sections of this report were in attendance. In addition, the following were present:

- E. H. Bomke, Senior Vice President, Power Engineering
- G. S. Braun, Consultant
- K. M. Broom, Senior Vice President
- R. A. Frazar, Manager, Quality Assurance (HL&P)
- A. J. Granger, Project Engineering Manager, (HL&P)
- G. Griffin, Supervisor, Project Engineering (HL&P)
- J. L. Hawks, Engineering Project Manager
- W. M. Rice, Group Vice President
- J. C. Shuckrow, Project Quality Engineer
- T. Stanley, Project Quality Assurance Supervisor (HL&P)
- K. A. Swarts, Senior Engineering Manager

The inspectors discussed the scope of this inspection and the details of the findings identified during the inspection. Management representatives of Brown and Root acknowledged the statements of the inspectors with respect to the four (4) deviations and one (1) unresolved items presented.

DETAILS SECTION II

(Prepared by D. F. Fox)

A. Persons Contacted

- A. Arceo, Assistant Librarian
- *R. W. Bass, Section Manager, QA Audits
- D. Boyd, Lead Librarian
- *P. J. Bulten, Section Manager, Vendor Surveillance
- *T. H. Gamon, Department Manager, Quality Assurance
- *A. Geisler, Section Manager, Licensing
- C. R. Guruprasad, STP (South Texas Project) Site Resident Auditor
- *L. R. Jacobi, Licensing Engineer, Houston Lighting & Power
- *D. Janecke, QA STP Project Coordinator
- *P. Jordan, Licensing Engineer
- E. J. Manning, QA Lead Auditor
- *H. G. Overstreet, QA Engineer, Houston Lighting & Power
- *H. Paperno, Assistant Department Manager, Quality Assurance
- *C. Vincent, STP Project QA Manager
- D. A. Walker, STP Site Lead Resident Auditor
- C. E. Williamson, STP Site Resident Auditor

*Denotes those present at the exit meeting.

B. Audits1. Objectives

The objectives of this area of the inspection were to verify that:

- a. An audit system is established which has organizational independence, authority, and is documented in procedures and/or instructions in accordance with commitments.
- b. Audit records include a written audit plan, team selection, audit schedule, and audit notification to the person or organization to be audited.
- c. Members of the audit team are independent of any direct responsibility for the activities being audited.
- d. Provisions exist for the reporting of the effectiveness of the Quality Assurance Program to responsible management.

- e. The audit includes the use of checklists or procedures, detailed audit reports, and timely identification, acknowledgment, documentation of nonconformances, and subsequent corrective action and its verification.
- f. Audit reports contain the audit scope, identification of auditors, persons or organizations contacted, summary of the results of the audit, the details of any nonconformances noted, the recommendations for correction, and distribution of the report to responsible management.

2. Methods of Accomplishment

The preceding objectives were accomplished by review of:

- a. Sections 17.0.B (Brown & Root, Incorporated) and 17.1.18.B (Audits-Brown & Root, Incorporated) of the PSAR for the HL&P (Houston Lighting and Power) STP (South Texas Project) Units 1 & 2 Nuclear Power Plants through amendment 32 dated October 17, 1975, to determine the original Brown & Root, Incorporated (B&R) commitments relative to quality assurance audits.
- b. Chapter 17 of the FSAR for the HL&P STP Units 1 & 2 Nuclear Power Plants through amendment 2 dated October 9, 1978, to determine the current B&R commitments relative to quality assurance audits.
- c. Sections 17.0 (Quality Assurance During Design & Construction, 17.2 (Quality Assurance Program) 17.6 (Document Control) and 17.18 (Audits)) of the NRC accepted B&R Topical Report No. B&R-002 A (B&R Quality Assurance Program for Nuclear Power Plants), Revision 2 dated September 1977, to determine the B&R corporate QA programmatic commitments to quality assurance audits.
- d. The B&R Corporate Statement of Policy on the Quality Assurance Program signed by T. J. Feehan, President of B&R, on September 26, 1979, to determine the current B&R commitments to a viable quality assurance program.
- e. Sections 2.0 (Quality Assurance Program), 5.0 (Instructions, Procedures and Drawings) and 18.0 (Audits) of the B&R Quality Assurance Manual through the revision dated December 17, 1979,

dated July 15, 1977, to determine the specific education, training, and experience requirements for qualification and certification of quality assurance auditors.

- j. The following B&R procedures contained in the South Texas Project Engineering Procedures Manual to determine the specific B&R commitments relative to control of Engineering Procedures, design changes, and changes from the PSAR design and quality assurance provisions:

STP-GR-001-B, Rev. E, 9/1/77;	Engineering Procedure for Manual Control
STP-DC-012,E, Rev. E, 5/3/77;	Engineering Procedures for PSAR Change Control
STP-DC-012-H, Rev. H, 11/17/79;	Engineering Procedure for FSAR/ER Change Control

- k. Review of the following quality assurance audits and audit files to determine that the approval procedures and management programs relative to quality assurance audits are being adequately implemented.

Audit Files/Records

A350-5	B369-5	H319-3	0040-14	W255-2	QAIRB-4
A480-9	B515-2	J127-1	P070-1	BR-38	QH-13
A480-11	C539-1	0040-10	P319-2	BR-42	QH-16
A510-2	C628-5	0040-12	P365-3	BR-43	
A350-3	H045-2	0040-13	Y018-2	BR-48	
			W120-3		

- l. The qualification and certification records of twenty-five (25) B&R audit personnel.

3. Findings

- a. Deviations from Commitment

Three (3) deviations from commitments were identified in this area of the inspection. See Notice of Deviation, items B.1. through B.6., C.1. through C.3., and D.

With respect to Items B. and C:

1. The following additional observations were noted by the inspector.
 - (a) There did not appear to be any records or other documentation that:
 - (1) Audit personnel who conducted one (1) internal and three (3) vendor audits were trained and qualified in accordance with the Quality Assurance Personnel Training Manual.
 - (2) The audit team members were adequately oriented prior to the execution of five (5) internal and eight (8) vendor audits.
 - (3) The audit reports contained an overall assessment of the effectiveness of the audited Quality Assurance Program for five (5) internal and seven (7) vendor audits.
 - (4) Reviews were conducted at three month intervals of open and closed audit deficiency reports to determine generic or repetitive problem areas.
 - (b) Certification forms and other documentation records for some auditors and lead auditors appeared to be inconsistent, inaccurate, out-of-date or missing.
2. The quality assurance management acknowledged the non-adherences to procedural and committed ANSI requirements and immediately initiated plans for both corrective and preventive action, some of which were completed prior to the exit meeting of this inspection. The management further stated that the current procedural requirements and implementing practices are under review and will be revised and upgraded as necessary.

b. Follow-up Item

It could not be determined that B&R was implementing the PSAR commitments with respect to implementation of 10 CFR Part 50 Appendix B quality assurance requirements for organization, design document and interface control, design verification, procurement and purchased material control, inspection, and test control for the STP.

These areas will be the subject of future inspections at Brown and Root Incorporated.

DETAILS SECTION III

(Prepared by J. M. Johnson)

A. Persons Contacted

R. Attar, Discipline Engineer (Structural Steel)
*P. J. Bulten, Vendor Surveillance Section Manager
*J. R. Childers, Assistant Houston QA Coordinator
*A. H. Geisler, Manager Nuclear Licensing
*T. J. Haynes, Vendor Surveillance Staff Supervisor
*D. W. Janecke, Houston QA Coordinator
*P. S. Jordan, Project Licensing Supervisor
R. Kimball, Project Vendor Surveillance Coordinator
J. McCaffrey, Responsible Engineer
J. T. Moore, Manager Quality Systems
T. Natarajan, Discipline Project Engineer (Materials)
*R. W. Peverley, Assistant Engineering Project Manager
G. Purdy, Manager QA Engineering

*Denotes those present at exit meeting.

B. Follow-up of Construction Deficiency Report

On December 4, 1979, Houston Lighting and Power Company notified Region IV, NRC, of a reportable deficiency involving an apparent breakdown in the Brown and Root vendor surveillance program. This resulted in shipment and installation of Reactor Vessel Vertical Supports fabricated by Bostrom-Bergen for which welder certification documentation records are inadequate. A related allegation concerning the failure of thirty-two (32) of thirty-four (34) Brown and Root vendor surveillance personnel to pass recertification tests was inspected also.

1. Objectives

The objectives of this area of the inspection were to determine the following:

- a. Accuracy of information reported to NRC.
- b. Generic aspects.
- c. Cause of the deficiency and the timeliness of its identification.

- d. Corrective action and preventive action at Brown and Root.
- e. Documentation review concerning the Brown and Root vendor surveillance personnel that failed recertification examinations.

2. Method of Accomplishment

The preceding objectives were accomplished by an examination of the following:

- a. Houston Lighting and Power letter dated 1/4/80 to Region IV, including attached "Final Report on Reportable Deficiency Concerning Inadequate Vendor Surveillance."
- b. Brown and Root Purchase Order No. 35-1197-6008 for Category I miscellaneous steel dated October 15, 1976, to Bostrom-Bergen, including invoked Specification No. 3A0/055026F, and also including Change Order No. 6 which adds reactor vessel supports to this order. Specification has safety Class 3 designation, and imposes AWS D.1.1. for welding. Review was to determine P.O. requirements.
- c. Brown and Root approved Vendor Lists dated 10/9/75, 7/2/76, 10/9/76 and through to 3/28/79, to determine whether Bostrom-Bergen was an approved supplier. Bostrom-Bergen was shown as an approved supplier for miscellaneous steel. Required reaudits of the facility covering applicable 10 CFR 50, Appendix B, criteria were made to maintain approved vendor status.
- d. Letter from Brown and Root QA Manager dated 1/31/80, and related correspondence No. STQ-5811 recommending removal of Bostrom-Bergen from Approved Vendor List and indicating the reasons for removal.
- e. South Texas Project (STP) Preliminary Safety Analysis Report (PSAR), Section 17.1.2.B., Brown and Root QA Program, to identify Brown and Root commitments for surveillance personnel and their training.
- f. South Texas Project PSAR, Sections 3.8.3 and 3.8.4 and question 130.20 to identify commitments concerning RPV supports.
- g. Brown and Root QA Manual, Section 2.0 (Quality Assurance Program) and Section 7.0 (Control of Purchased Material, Items) to determine requirements for training and records for vendor surveillance personnel, and for performance of surveillance activities.

- h. Brown and Root QA Personnel Training Manual (referenced by both the QA Manual and the PSAR, Chapter 17), especially Part I including Attachment 1, Supplement D and Supplement G, and Part II, new STP Supplementary Training Procedures, including Chapter 3 (Examination and Certification) to determine specific procedural requirements.
- i. Vendor Surveillance Reports dated 11/30/76, 12/21/76, 6/20/77, 7/1/77, 10/11/78, 5/14/79, to determine degree of vendor surveillance and whether welder certification was examined.
- j. Certificate of Conformance for Reactor Vessel Support No. A33-1 dated 11/14/77, on which final surveillance was waived because of previous inspection on 11/4/77.
- k. QA audits of Bostrom-Bergen (Oakland and Fresno), including audit dated 10/8 - 17/79 which issued twenty (20) Audit Deficiency Reports (ADRs) and stated that Bostrom-Bergen has lost control of their Quality Program, to determine auditing per requirements. Associated correspondence concerning corrective actions was also reviewed.
- l. Stop work notices:
 - (a) Site stop work for installation or use of Bostrom-Bergen items (now lifted);
 - (b) Stop work H004 for Bostrom-Bergen fabrication plants, which is still in effect.
- m. Qualification and certification documentation for ten (10) Supplier Surveillance Specialists, one (1) Vendor Surveillance Section Manager, and one (1) Supplier Surveillance Supervisor/Specialist, including required certifications, grades and eye examination records, as available, to determine whether procedural requirements were met. Also included were certain proficiency/recertification examinations.
- n. Qualification documentation for five (5) QA Engineers who have been performing surveillances in lieu of Supplier Surveillance Specialists who were under going retraining and recertification. These were examined to establish qualification.
- o. Records concerning proficiency/recertification examinations taken between 11/2 - 5/79, to determine accuracy of the allegation.

- p. Brown and Root Incident Review Committee meeting minutes dated 10/29/79, 11/9/79 and 12/5/79 concerning Bostrom-Bergen, to determine basis for the engineering evaluation that there will be no adverse effect on safe operation.
- q. Nonconformance Report (NCR) No. H0310 dated 12/4/79 identifying Brown and Root vendor surveillance failure to detect an apparent significant breakdown in a Category I miscellaneous steel suppliers' QA program. This NCR initiated the 50.55(e) notification to NRC by Houston Lighting and Power. The NCR was reviewed for status and proposed corrective and preventive actions.
- r. Brown and Root Correspondence:
 - (1) No. STQ-5147 concerning results of vendor surveillance proficiency exams and proposed actions.
 - (2) No. QAQ-1012 concerning increased emphasis on verification of welder certifications.
 - (3) Nos. STQ-5221, QAQ1009 and STQ-5862 concerning vendor surveillance training classes.
 - (4) No. STQ-5811 documenting actions taken concerning Bostrom-Bergen.
 - (5) No. QAQ1025 concerning Vendor Control Program Study to determine effectiveness of prior vendor surveillance. These were examined to assure that corrective and preventive actions are being taken.
- s. Reactor Supports Review Summary study submitted to Brown and Root on 1/2/80 by Bostrom-Bergen identifying materials, requirements, weld procedures and welders used and the fact that welder certifications are not available for these welders.
- t. Brown and Root letter Q-0100 to Houston Lighting and Power concerning upgrading of vendor surveillance program and attached correspondence No. STQ-5414 giving details.

3. Findings

- a. In this area of the inspection, three (3) examples of a deviation were identified (See Notice of Deviation, Items C.4, C.5, and C.6). No unresolved items were identified.

- (1) Related to Deviation C.4., partial corrective action was taken during the course of the inspection, but further corrective action, evaluation, and preventive action still need to be taken.
 - (2) Related to Deviation C.5, corrective action was taken during the course of the inspection, in that the QA Manager issued a letter certifying the Vendor Surveillance Section Manager. Preventive action has not yet been addressed.
 - (3) Related to Deviation C.6, corrective action was taken during the course of the inspection, in that this Supplier Surveillance Specialist/Supervisor was recertified. Preventive action has not yet been addressed.
- b. The information reported to the NRC was accurate.
- c. Concerning potential generic aspects:
- (1) Brown and Root has initiated a study of the effectiveness of their prior vendor surveillance of eight fabricators and of the final product acceptability. It is estimated that this study will be completed in approximately three (3) months, and will provide information to determine whether this was an isolated or a generic vendor surveillance problem. Evaluation for Part 21 will be made if it appears generic. Note that Brown and Root NCR H0310 will be held open until results of this study are complete to permit closure of the corrective, preventive and potential generic aspects of the deviation.
 - (2) The breakdown of the QA program at Bostrom-Bergen is considered to be general by Brown and Root, and not limited to welding only. However, the stop work imposed, the evaluation going on at Bostrom-Bergen and the necessity for closure of ten (10) NCRs and twenty (20) AFR (Audit Finding Reports) prior to resuming work, assures that no structural steel for South Texas Project is being fabricated until problems are resolved. This is the only

contract Brown and Root has with Bostrom-Bergen, although, by report, Bostrom-Bergen has another nuclear contract for a different plant, and certain items have been interchanged causing a traceability problem. The stop work for use of Bostrom-Bergen products at the site permitted review to assure no further installation of potentially defective items. It has now been lifted. Also, Bostrom-Bergen has been removed from Brown and Root Approved Vendor List.

d. Cause of the deficiency:

- (1) The vendor was audited to applicable 10 CFR 50, Appendix B, criteria and found qualified prior to placement of the order, was listed as an approved vendor, and was audited during the course of fabrication. Vendor surveillance was performed on a scheduled basis, and surveillance reports meet procedural requirements, provide detailed information, and fourteen address certification of welders and/or state that records are on file. Vendor surveillance report dated 11/4/77, for example, shows specific welder certifications to specific processes and positions.
- (2) However, the report submitted by Bostrom-Bergen on 1/2/80 lists welders for vertical and horizontal supports for units 1 and 2 and indicates that none of the seventeen welders has current certifications. Brown and Root management stated that Bostrom-Bergen had a well implemented QA program until 1978, when they were without a QA manager for two months and then a new QA manager was selected. They describe the problems to be a deterioration of the program during and since that time.
- (3) Brown and Root issued ten (10) NCRs and twenty (20) AFRs in the fall of 1979 and the Brown and Root audit group identified multiple problems considered to represent a QA breakdown. Prior audit in March, 1979, issued 10 AFRs. These audit findings demonstrate that Brown and Root vendor surveillance had missed timely identification of quality problems at Bostrom-Bergen. Brown and Root has therefore established more stringent requirements, training and testing of Supplier Surveillance Specialists.

- (4) The inspector reviewed qualification and certification of Supplier Surveillance Specialists before and after the initiation of more stringent requirements and identified certain failures to follow the Brown and Root certification program requirements. These are delineated in the Notice of Deviation, Item C. In several instances, qualification of the uncertified Supplier Surveillance Specialists is indeterminate because of missing required records, but in most cases the surveillance personnel appeared qualified to the procedural requirements at the time. The prior procedural requirements met ANSI N45.2.6 requirements for the appropriate surveillance level, as do the new more stringent requirements.
- e. Corrective and preventive action at Brown and Root has included issuance of NCR H0310, issuance of a stop work at the site (now lifted) and of a stop work at Bostrom-Bergen facility (issued in October, 1979, and still in force), and proficiency testing of Supplier Surveillance Specialists. The proficiency/recertification testing resulted in development of a new upgraded training program for Supplier Surveillance Specialists, and the decision not to send personnel on any surveillances until they had qualified under the new program. Also, a new Vendor Surveillance Section Manager has been named. Certifications are now issued by discipline Level IIIs rather than by section manager. The status of corrective and preventive actions is as follows:
- (1) More stringent procedures for training, qualification and certification have been issued.
 - (2) Training manuals have been revised and issued.
 - (3) Week-long training classes have been held twice and additional classes are scheduled.
 - (4) Personnel who passed examinations at the end of the training classes have been certified.
 - (5) Training classes and certification will be ongoing until completed by the identified personnel.
 - (6) Interim measures taken to assure uninterrupted surveillances included the use of QA Engineers who had passed the required discipline examinations to perform surveillance activities. Records indicated that these persons were qualified, but not certified (See Notice of Deviation, Item C.)

- (7) The only safety-related items released with final surveillance inspection waived were:
- (a) Five (5) ASME Section III Class 3 pumps on purchase orders 4/22 - 8/22 from Hayward Tyler (Waiver No. STQ 5217). These were inspected at the site.
 - (b) Six (6) ASME Class I pipe hangers from NPS on Purchase Order No. 6017 (Waiver no. STQ5269). These were inspected at the site.
- f. Documentation reviewed at Brown and Root concerning the related allegation that 32 of 34 Vendor Surveillance personnel failed recertification examination disclosed:
- (1) Proficiency/recertification examinations given November 2-5, 1979, were to the new, upgraded standards. Therefore, they were more difficult than the original examinations taken and passed by these same persons. The new examination consisted of 5 discipline-oriented tests.
 - (2) Of twenty-nine people who took some or all of the tests, only 14% (or 5 people) passed any discipline test (e.g. electrical, mechanical, visual examination, coatings or civil/structural).
 - (3) As described earlier in this report, persons who did not pass any part were taken off of surveillance activities until they have been retrained, retested and certified.
- g. Followup will be performed at a later date to determine the results of the Brown and Root study now underway to determine whether vendor surveillance failure to identify quality-related problems at Bostrom-Bergen is an isolated incident or a generic problem. If the problem is determined to be generic, evaluation will be made of possible effects on product safety and reportability under Part 21.
- h. Further review will be made to assure that the Brown and Root purchase order (including invoked technical specifications) for the reactor vertical supports imposed all quality requirements specified in the SAR.