

VENDOR INSPECTION REPORT

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

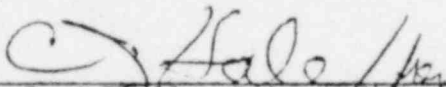
Report No. 99900509/78-05

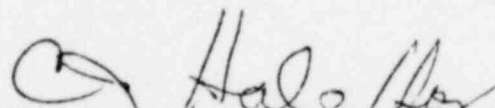
Program No. 44090


Company: Stone & Webster Engineering Corporation  
Post Office Box 2325  
Boston, Massachusetts 02107

Inspection at: Cherry Hill Operations Center

Inspection  
Conducted: October 17-20, 1978

Inspectors:  11-3-78  
J. R. Costello, Principal Inspector  
Vendor Inspection Branch Date

 11-3-78  
J. M. Johnson, Contractor Auditor  
Vendor Inspection Branch Date

Approved by:  11-3-78  
C. J. Hale, Chief, Projects Section  
Vendor Inspection Branch Date

Summary

Inspection on October 17-20, 1978 (99900509/78-05)

Areas Inspected: Implementation of the requirements of Title 10 CFR 50, Appendix B, in the areas of design corrective action, design interfaces and action on previous inspection findings. The inspection involved fifty-six (56) inspector hours on-site by two (2) NRC inspectors.

Results: In the three (3) areas inspected, two (2) deviations were identified in one (1) area and one (1) unresolved item was identified in another area.

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Deviations: (1) Design Corrective Action - Contrary to 10 CFR 50, Appendix B, Criterion V and Engineering Assurance Procedure No. 15.2, the N&D Coordinator was not indicating in all cases in the N&D log whether a problem report would be prepared as a result of a N&D report (See Notice of Deviation, Enclosure); (2) Design Corrective Action - Contrary to 10 CFR 50, Appendix B, Criterion V and Engineering Assurance Procedure No. 15.2 technical justification was not provided for all N&D reports dispositioned accept-as-is or repair (See Notice of Deviation, Enclosure).

Unresolved Item: Design Interfaces - Present implementing procedures and Revision C to Topical Report SWSQAP1-74A, which has been submitted to the NRC for approval, permit items which do not conform to procurement documents to be reported as unsatisfactory and returned to the vendor. The present Topical Report states that items which do not conform to specification requirements shall be reported as nonconformances. This will remain unresolved pending NRC disposition of SWSQAP1-74A, Revision C (Details Section II, paragraph B.3.b).

DETAILS SECTION I

(Prepared by J. R. Costello)

A. Persons Contacted

- J. C. Bisti, Lead Control Engineer
- \*W. R. Curtis, Engineering Assurance Engineer
- I. L. Guthrie, Construction Specialist
- J. R. Kirby, E&DCR Coordinator
- \*J. A. Kirkebo, Project Engineer
- \*G. Krishnamurthy, Assistant Project Engineer
- \*R. J. McMorland, Engineering Assurance Engineer, Projects
- \*G. R. Mikula, Quality Assurance Engineer, Projects

\*Denotes those present at exit meeting

B. Action on Previous Inspection Findings

1. (Closed) Unresolved Item (Report No. 78-03): Requirements for identifying the independent objective reviewer's signature by an "I" when signature approval is delegated does not appear to be well defined. The two (2) electrical design criteria documents referenced in NRC inspection report No. 78-03 have been corrected to show the independent objective reviewer's identification. Also, EAP 5.20 (Operations Center Interface With Boston Engineering Department) and EAP 5.21 (Preparation, Review and Control of QA Category I Electrical Design Criteria) have been revised to specifically require the independent reviewer's identification; these EAPs will be issued by October 30, 1978.
2. (Closed) Unresolved Item (Report No. 78-03): Logic Diagrams which are key design documents are being revised without an independent objective review because of a question of availability of necessary informations. The Operations Services Division, who is responsible for this review, is presently revising the procedure for the review of key design documents. This revision will provide instructions to the reviewer for reviewing these documents when design requirements are not documented in system descriptions, or when the documents are in various stages of completion. Until this revision is issued, the reviewers are proceeding on instructions contained in a memo from E. J. Siskin, Operations Services Division Chief Engineer, dated September 21, 1978, to all concerned personnel. This memo described the proposed revision to the procedure and instructs cognizant personnel to perform an independent review for documents whose design requirements are not documented in system descriptions and for documents in various stages of completion.

C. Design Corrective Action

1. Objectives

The objectives of this area of inspection were to examine and verify that (1) adequate procedures do exist and are being implemented for identifying deficiencies of a significant or recurring nature, (2) that measures exist for determining the cause of deficiencies and for initiating corrective action to prevent recurrence, (3) deficiencies and corrective actions are reported to appropriate levels of management, (4) follow-up action is taken when necessary, and (5) the design process and verification procedures are re-reviewed when significant design changes or recurring deficiencies occur.

2. Method of Accomplishment

The preceding objectives were accomplished by an examination of:

- a. Section 17 of the Preliminary Safety Analysis Report (PSAR) for River Bend Station Units 1 and 2.
- b. Implementing procedures to satisfy PSAR Quality Assurance Program commitments and to satisfy the intent of the Objectives section above. These procedures are as follows:

(1) Quality Standards (QS):

QS-15.1 Nonconformance and Disposition Report Field Quality Applications

QS-15.2 Nonconformance and Disposition Report Shop Applications

QS-16.1 Problem Reports

(2) Quality Assurance Directives (QAD):

QAD-6.8 PQC Use of Engineering and Design Coordination Reports

QAD-15.1 PQC N/D Report Preparation and Processing

QAD 15.2 Field Nonconformance and Disposition Report Status Reporting and Data Analysis

(3) Engineering Assurance Procedures (EAP):

- EAP 4.13 Processing of Project Specifications
- EAP 5.3 Control of Manual and Computerized Calculations
- EAP 5.4 Review and Approval of Project Production Drawings
- EAP 5.8 Review of Supplier Drawings
- EAP 5.20 Operations Center Interface with Boston Engineering Department
- EAP 5.21 Preparation, Review, and Control of QA Category I Electrical Design Criteria
- EAP 15.2 Handling of Nonconformance and Disposition Reports by Engineering
- EAP 16.1 Reporting of Significant Problems for Corrective Action
- EAP 16.2 Reporting Significant Deficiencies to the Client

(4) River Bend Project Procedures (RBP):

- RBP 12-5 Engineering and Design Coordination Report Procedure

c. Documents to verify implementation of PSAR Quality Assurance Program commitments and to satisfy the intent of the Objectives section:

(1) Monthly Reports to the Client in File No. G4.1 River Bend Stations - Units 1 and 2:

Project Report - Months of December 1977 and January 1978

Project Report - Month of March 1978

Project Report - Month of July 1978

Project Report - Month of August 1978

(2) Nonconformance and Disposition Reports (N&Ds):

(a) Shop N&Ds (Procurement N&Ds):

PQC-P-9157 Shop Fabricated Pipe  
PQC-P-1300B Air Ejector System  
PQC-P-0857 Coupling 1" Off Channel Center Line  
PQC-P-0886 Feed Water Heater  
PQC-C-1295 Orifice Plates  
PQC-P-0440 Condenser Lower Shell Section  
PQC-S-2979 Stiffener  
PQC-S-2992 Reinforcing Bar

(b) Field N&Ds:

FQC-E-8836 Motor Generator Sets  
FQC-E-8907 GE HPCS Motor  
FQC-M-8924 Residual Heat Removal Pumps  
FQC-M-8920 GE Gate Valve 900# 10"

(3) Engineering and Design Coordination Reports (E&DCRs):

P-S-224 Placing Concrete and Reinforcing Steel  
P-P-106 Remove Spool Piece Between Valve  
P-M-G-133 Specified Bolt Torque

(4) Problem Reports:

PR-P-104 Burned Out Motors on Gland Steam Exhausters  
PR-EM-1 Piping Support Design Deficiency  
PR-CS-14 Chronic Main Feedwater Instabilities

(5) Stop Work Orders:



- (a) Stop Work Directive on PO-232-532-087 as a result of S&W audit conducted on July 25-26, 1978 - Problem Description stated numerous nonconformances to the approved Quality Assurance Manual and implementing procedures. Areas of concern were Design Control, Procurement Document Control and the Auditing Program.
  - (b) Stop Work Directive on PO-215-350-073 as a result of S&W audits conducted during June and December of 1977 - Problem description stated failure to take timely corrective action to resolve numerous findings reported in S&W June and December audits.
- (6) Nonconformity and Disposition (N&D) Report Log, River Bend Project.
  - (7) Engineering and Design Coordination Report Control Log, River Bend Project.
  - (8) E&DCR and N&D Drawing Change Record, River Bend Project.
  - (9) E&DCR and N&D Specification Change Record, River Bend Project.
- (10) Specifications and Changes Thereto:
    - (a) RBS 219.710 Shop Fabrication and Field Erection of Reactor Containment Vessel, Penetrations, and Hatches; Drywell Head, Hatches, and Lines; and Shield Building Hatches - 5 addendums. Contractor - Graver Tank and Manufacturing Company.
    - (b) RBS 223.311 Fuel Pool Cooling Pumps ASME Code Section III, Class 3 - 4 addendums. Contractor - Gould Pump Inc.
    - (c) RBS 228.218 Reactor Feed and Testable Check Valves - 5 addendums. Contractor - Atwood Morrill.
    - (d) RBS 228.320 Fabrication of Pipe Rupture Restraints and Structures - 3 addendums. Contractor - Leddyne Brown Engineering.
    - (e) RBS 231.160 Miscellaneous Horizontal Centrifugal Pumps - 2 addendums. Contractor - Gould Pumps Inc.

(11) Drawings and Changes Thereto:

- (a) 12210-ES.59B.4 Primary Shieldwall, Plans and Details Reactor Building, Sheet 2.
- (b) 12210-EP-11A-2 Main Steam Safety Relief Valve Discharge Piping, Sheet 1.
- (c) 12210-EV-10G-2 Pipe Rupture Restraints Main Steam Reactor Building Restraint Assemblies.
- (d) 12210-BZ-108BW-2 Pipe Support Detail Tunnel Piping East of Auxiliary Building.
- (e) 12210-0228-211-049-011A 2½" Gate Valve Bolted Bonnet - Manual, Pressure Rating 150# - 1500#.
- (f) 12210-0223-311-021-0010D Fuel Pool Cooling Pumps Cross Section.

(12) Calculations and Changes Thereto:

- (a) No. 0222.410-002 Reactor Water Cleanup Recirculation Pump, approved March 3, 1977, superseded by No. 0222.410-003 approved January 9, 1978.
- (b) No. E81 Standby Charger Sizing, approved July 13, 1977, superseded by No. E90 approved February 21, 1978.

3. Findings

In this area of inspection no unresolved items were identified. Two (2) deviations from commitment were identified (See Notice of Deviation Enclosure, Items A and B, and additional information below).

- a. Concerning Item A, Enclosure (Notice of Deviation) the following corrective and preventive measures were established prior to the conclusion of the inspection.
  - (1) Corrective Action - The N&D Coordinator has obtained the necessary information and posted all the missing entries in column 8 of the Nonconformity and Disposition (N&D) Report Log.



- (2) Preventive Action - A memo has been issued by J. A. Kirkebo, Project Engineer to the N&D Coordinator dated October 18, 1978, directing him to individually contact the responsible engineer upon receipt of an approved N&D report to determine if a Problem Report is required. Also the N&D Coordinator is directed to place a copy of this memo in the front of each N&D Report Log.
- b. Concerning item B Enclosure (Notice of Deviation) the following corrective and preventive measures were established prior to the conclusion of the inspection.
- (1) Corrective Action - The three (3) N&D Reports described in item B of the Notice of Deviation Enclosure have been revised to show technical justification for accepting the nonconformance as use-as-is or repair.
  - (2) Preventive Action - A training session has been scheduled for all head and Principal Engineers on October 26, 1978, covering Nonconformance and Disposition (N&D) Reports. The presentation is scheduled twice and all head and Principal Engineers are directed to attend. This action will be confirmed during a future inspection.

D. Exit Meeting

A meeting was conducted with management representatives at the conclusion of the inspection on October 20, 1978. In addition to the individuals indicated by an asterisk in the Details Section, those in attendance were:

R. P. Byrnes, Assistant Engineering Manager  
A. E. Gallimore, Project QA Manager  
P. D. Piscator, Quality Assurance Supervisor  
C. N. Revelioty, Engineering Manager  
K. Varadarajan, Assistant Project Engineer  
R. B. Weaver, Engineering Assurance Coordinator

The inspector summarized the scope and findings of the inspection and discussed the closing of the unresolved items from the previous inspection. Management representatives acknowledged the statements of the inspector.

DETAILS SECTION II

(Prepared by J. M. Johnson)

A. Persons Contacted

D. Boe, Materials Engineer  
R. J. Ciccone, Principal Structural Engineer  
\*W. R. Curtis, Engineering Assurance Engineer  
R. DiSabatino, Lead Mechanics Engineer  
\*D. M. Campagna, Project Engineering Assurance Engineer  
\*E. B. Fleming, Senior QA Program Administrator  
\*M. I. Gilman, Quality Systems Division Representative  
\*W. A. Hedzik, Senior QA Program Administrator  
J. Lannon, Project Quality Assurance Engineer  
C. Passeri, Structural Engineer  
H. K. Ramchandra, Welding Engineer  
A. Shah, Structural Engineer  
C. Zehrer, Principal Piping Engineer

\*Denotes those present at the exit meeting

B. 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 which:

- 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 information transmitted between organizations which identified the status of the design information or documents and 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. Stone & Webster Topical Report SWSQAP 1-74 A, Revisions A and B, Section 3, Engineering and Design Control, Section 7, Control of Purchased Material, Equipment and Services, and Appendices 4, 5, and 7.
- b. Implementing procedures examined to satisfy topical commitments and address items 1.a. through 1.g. of the Objectives section:
  - (1) Quality Assurance Directives (QAD):
    - QAD-3.1 Review of Stone & Webster Technical Documents
    - QAD-15.1 PQC Nonconformance and Disposition (N&D) Report Preparation and Processing
    - QAD-15.2 Field Nonconformance and Disposition Report Status Reporting and Data Analysis
  - (2) Engineering Assurance Procedures (EAP):
    - EAP 6.3 Preparation, Review, Approval and Control of E&DCRs (Engineering and Design Coordination Reports)
    - EAP 3.4 Nuclear Steam Supply Systems (NSSS) Supplier Design Interface with the Stone & Webster Design
    - EAP 7.2 Processing of Seller Information Requests (SIR)

- EAP 4.13 Processing Project Specifications
  - EAP 3.13 Control of Unapproved Engineering and Design Documents
  - EAP 4.10 Preparation and Control of the Specification Directives
  - EAP 4.12 Processing Master Specifications
  - EAP 9.2 Review and Approval of Supplier Technical Documents
  - EAP 15.2 Handling of Nonconformance and Disposition Reports by Engineering
  - EAP 5.4 Review and Approval of Project Production Drawings
- (3) Quality Standards (QS):
- QS 14.2 Inspection Report System
- (4) Project Instructions Manual for Project 12177 - Volumes 1 and 2:
- (a) Project General Instructions;
    - Instruction II (Correspondence)
    - Instruction III (Engineering)
  - (b) Project Procedures (PP);
    - PP25 Control of Stone & Webster Drawings
    - PP15 Control of GE-NESD Documents
    - PP3 Project Specification and Procurement Procedures
    - PP16 Engineering and Design Coordination Reports (E&DCR)
    - PP17 Review and Approval of Supplier Documents

(c) Project Guidelines (PG):

PG 16 Processing N&D Reports for GE-NESD  
Supplied Equipment

PG 15 Design Review Coordination

(d) Project Memoranda (PM):

PM 17 Section III

(5) Construction Department Standards:

CMP (Construction Manual Procedure) 1.2  
Receiving Materials and Equipment

c. Documents examined to verify implementation of above program and procedural requirements, and to satisfy implementation of 1.a. through 1.g. of the Objectives section:

(1) Records of review, approval and coordination related to Specification 12177-P283B, Shop Fabrication and Field Erection of Reactor Primary Containment Steel Plate Liner (Purchase Order was to Graver Northeast):

Specification and Addendum 1,

Transmittal of S&W Drawing List to Graver and site  
(June 22, 1978),

Graver Drawing List, Revision 17 (September 15, 1978),

Drawing Status Sheet,

Stone and Webster Drawing 12177-EV-IJ, Revision 9,  
Electrical Piping Penetrations,

Graver Drawings: NL 10008, Revision 7, Liner Bottom Embedment Details; NL 10787, Revision 7, Sectional Elevation and Details of 28" Penetration Assembly; NL 10797, Revision 7, Sectional Elevation and Details of 10" Penetration Assembly; NL 10941, Location and Section of Primary Containment Liner Stiffeners at El. 211' 9½" to El 229' 9½",

E&DCR No. P10435,



N&D Nos. 0551, 0552, 0516, 0539,

Graver Procedures:

Welding - Shielded Metal Arc - 138N, Revisions 12 and 13,

Liquid Penetrant Examination - LPE-4, and Project Monthly Reports for June and August, which reported technical meetings between Graver and S&W, and transmittal of information to the licensee.

- (2) Records of review, approval and coordination related to Specification 12177-P301Y, Drywell Floor Downcomers (Purchase Order was to Dravo);

Document/Specification Review Form, comments and resolution; No. 45517 with QA comments, No. 40698 with Power comments, No. 42709 with Materials comments,

Transmittal and Specification to Licensee (November 16, 1978), and Licensee comments and resolution,

Specification and Addenda 1, 2, 3, and 4,

Transmittal letter No. T 10,524 to Dravo transmitting Drawing 12177-EV-79A, Revision 3 and associated Record of Drawing Changes,

S&W Drawing 12177-EV-79A, Downcomer Penetrations and Cover Plates,

E&DCR Nos. 1286 and 9098,

Dravo Weld Procedure No. 1-8-T2304-S5, Revision 7,

Dravo Drawings E-3133-DPA, Revision 3 and E-3133-DPB, Revision 3 for Drywell Floor Downcomers, and

QA Inspection Reports T158A for four Drywell Floor Downcomers (June 9, 1978, and June 19, 1978).

- (3) Coordination with GE-San Jose related to (1) and (2) above;

Project Monthly Reports for May and August of 1978 concerning meetings with GE regarding dynamic load data, and



Dickers Drawing No. G-471-6/125.04.03 (Safety Relief Valve B22-F013) with GE buyer stamp.

- (4) Records of review, approval and coordination related to Specification 12177-S203C, Placing Concrete and Reinforcing Steel (Purchase Order was to Walsh Construction Company),

Specification and Revision 1, 2, and 3,

Document/Specification Review Form dated November 19, 1975, and comments by Materials Engineering, Field QC, and Construction,

Record of Revision 2 and 3 changes incorporating approved E&DCRs and N&Ds,

Transmittal of Revision 3 to licensee on July 5, 1978, (no comments), and

S&W Drawings EC36A, Revision 1, 2, 4, and 6, Exterior Wall Elevation 1-1 Reinforcement, Reactor Building and Auxiliary Bays; EC40C, Revision 1, Reactor Pedestal Anchor Bolt Plan Schedules and Details; EC40A, Revision 6, Reactor Pedestal, Reactor Building; and EC30A, Revision 8, Key Plan E1 175'0", Reactor Building and Auxiliary Bays.

### 3. Findings

- a. There were no deviations identified in this area of the inspection.
- b. One unresolved item was identified, as follows:

Stone & Webster Topical Report SWSQAP 1-74A, Revisions A and B, state that "Receipt inspection includes verification that the items conform to the procurement documents . . . Items which do not conform to the specification requirements shall be reported as nonconformances."

Current implementing procedures do not meet Topical commitments above, because they do not require that items identified during site receiving inspection as not conforming to the specification requirements be reported as nonconformances if it appears they can be reworked. Four Drywell Downcomers were handled per current procedures, and identified on the Inspection Report as unsatisfactory (U) and returned to vendor (V), but no nonconformance report (N&D) was generated.

Stone & Webster SWSQAP 1-74A, Revision C, which has been submitted to NRC, changes the wording in 7-2 to state that "Items which do not conform to the specification requirements shall be reported as "Unsatisfactory" (UNSAT).

This item is considered unresolved pending NRC disposition of Revision C of SWSQAP 1-74A.