VENDOR INSPECTION REPORT

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

Report 10. 99900509/78-02

Program No. 44090

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

Inspection Conducted: April 3-6, 1978

Inspectors:

D. G. Anderson, Principal Inspector, Vendor Inspection Branch

Date

11/21/78

I. R. Rutherford, Senior Mechanical Engineer, I&E, HQ

Approved by:

C. J. Hale, Chief, Projects Section, Vendor Inspection Branch

Summary

Inspection on April 3-6, 1978 (99900509/78-02)

Areas Inspected: Implementation of 10 CFR, Part 50, Appendix B in the design area (Design Inspection). The inspection involved fifty (50) inspector hours on site by two (2) NRC inspectors.

Results: No unresolved items or deviations were identified.

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DETAILS SECTION

A. Persons Contacted

- *F. B. Baldwin, Assistant Quality Assurance Manager
- B. R. Barnhart, Structural Engineer
- J. S. Carty, Lead Power Engineer
- *E. P. Doherty, Lead Engineer, Engineering Assurance
- *E. B. Fleming, Senior Quality Assurance Program Administrator R. E. Foley, Assistant to Chief Engineer, Engineering Mechanics Division
- G. S. Krall, Engineering Assurance Engineer
- D. F. Shave, Supervisor, Pipe Stress Analysis
- J. F. Sinclair, Supervisor, Engineering Assurance Audits

B. Design Inspection

1. Objectives

The objectives of this area of the inspection were to select a single component, system, structure, or major part of one of these and verify that:

- a. Design inputs are: identified and include all applicable requirements; documented; reviewed and approved; specified on a timely basis and in necessary detail; prepared, processed, and controlled in accordance with applicable procedures; accurate in specifying design requirements, particularly design codes and standards; and distributed to those responsible for preparing production designs and associated documents.
- b. Design calculations, and their review and approval, have been performed as prescribed by procedures.
- c. Final design documents have accurately transcribed design input in accordance with procedures.
- Internal and external design interface responsibilities and activities have been performed in accordance with procedures.
- e. Verification of the design has been properly and effectively performed as prescribed by procedures, including design review (including checking), alternate calculations, and qualification testing, where applicable.

- f. Changes to the design, through all design activities from input to output, have been performed in accordance with procedure requirements.
- g. Design corrective actions have been applied, as necessary, to the design for applicable activities in accordance with procedures.
- h. The design document control system is effective for the item design documents in accordance with procedures.
- Procurement documents have been properly prepared for the item in accordance with procedures and include the necessary documents.

2. Method of Accomplishment

The preceding objectives were accomplished by verifying that:

- a. Design inputs were identified in the Preliminary Safety Analysis Report, Millstone Nuclear Power Station, Unit 3, Docket No. 50-423, Volume 4, Section 9.1.3, Fuel Pool Cooling and Purification System, Westinghouse System Standard Design Criteria-Nuclear Steam Supply System Design Transients (ID No. 1.3), and Millstone Unit No. 3 Class I Transients Master Transient Summary.
- b. Design control including design calculations were identified in the Stone and Webster Topical Report SWSQAP 1-74, Section 3, Engineering and Design Control. The following design calculations were performed according to Engineering Assurance Procedure (EAP) 5.3, Control of Manual and Computerized Calculations, and EMAG-41-C, Preparation, Review, and Control of Manual and Computerized Calculations.

X07700.014, Pipe weights and valve weights. X07700.016, Structural displacement of cooler nozzles. X07700.017, Thermal anchor movements of fuel pool cooling pumps. X07700.018, Seismic displacements - 0.5 SSE. X07700.022, Seismic displacements - 1.0 SSE. X07700.025, Seismic displacements at various elevations. X07700.026, Allowable loads on fuel pool cooling pump. X07700.028, Spring hanger design. X07700.029, To calculate intensification factor for 12" x 12" x 12" reinforced tee. X07700.030, To calculate allowable stress for Equations 8, 9, 10, and 11 as per Class 2 and 3 criteria. Computer run 12179-EP-109, Problem 10901, runs X079 and 107

- Computer Calculation 12179-AX-77A-1, Pipe Stress Analysis Summary Fuel Pool Cooling and Purification, Problem 7700-NUSCO EP-77.
- Calculation Book #031, Job 12179, Seismic Analysis Fuel Building.

c. Final design documents have accurately transcribed design input according to EAP 5.9 (Preparation, Review and Approval of Flow Diagrams) and EAP 5.4 (Review and Approval of Stone and Webster Project Drawings) by review of the following:

Millstone Nuclear Power Station, Unit No. 3, Flow Diagram Fuel Pool Cooling and Purification Drawings, 12179-Fsk-34-1.0, 1A, 1B, 1C, 1D, 1E, and 1F.

Millstone Nuclear Power Station, Unit No. 3, Fuel Pool Cooling and Purification Piping Diagrams, 12179-EP-77-A-1, B-2, C-2, D-2, E-2, F-2, and Isometric 12179 - AX-77A.

d. Internal and external design interface responsibilities and activities were performed according to EAP 3.4, (Nuclear Steam Supply System (NSSS) Supplier Design Interface with the Stone and Webster Design) and EAP 5.20 (Operations Center Interface with Boston Engineering Department) by review of the following:

Westinghouse System Standard Design Criteria-Nuclear Steam Supply System Design Transients (ID No. 1.3).

Nerm-7, Description of Work-Millstone Nuclear Power Station Unit 3 - Northeast Utilities Service Company, Section XIII-22 Fuel Pool Cooling and Purification System.

- e. Design verification was properly and effectively performed as prescribed by EAP 3.1, (Verification of Nuclear Power Plant Designs) by checking and alternate calculations for the calculations as noted in B.2.b. above.
- f. Changes to the design, through all design activities from input to output were accomplished according to EAP 5.3, (Control of Manual and Computerized Calculations) for changes to hand and computer calculations as noted in B.2.b. above, and for calculation:

12179-PX-56-GA, Class I Temperature Pressure Transients (RHR) Change No. 1 and Change No. 2.

g. Design corrective actions are being applied in accordance with EAP 16.1, (Reporting of Significant Problems for Preventative Action (Feedback)) by review of the following:

Problem Report No. EM-1, (Piping Support Design Deficiency), the response, and the recommended corrective action.

h. The design document control system is effective for computer codes according to EAP 5.25, (Computer Program Documentation and Qualification) by review of the following:

NUPIPE, Program Users Manual, ME-110, Controlled Copy 245/8, a computer code for stress analysis of nuclear piping.

i. Procurement documents have been prepared in accordance with EAP 4.10, (The Preparation and Control of the Directive for the Preparation of Specifications), EAP 4.11, (Preparation, Issue, and Control of Standard Technical Requirements for Specifications), and EAP 4.1, (Procurement System-Power Industries Group) by review of the following:

Specification No. 2214.702-006, J.O. 12179, Fuel Pool Ccoling Pumps.

Purchase Order No. 2214.702-006, J.O. 12179, Fuel Pool Cooling Pumps.

3. Findings

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

C. Exit Meeting

A meeting was conducted with management representatives at the conclusion of the inspection on April 6, 1978. In addition to the individuals indicated by an asterisk in paragraph A above, those in attendance were:

G. J. Burroughs, Project Manager

- N. B. Cleveland, Vice President, Quality Assurance
- D. E. Ellis, Chief Materials Engineer

J. W. Kelly, Project Quality Assurance Program Administrator

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B. V. Miller, Regulatory Advisor
L. D. Nace, Chief Engineer, Engineering Assurance Division
F. L. Pfischner, Assistant Chief Licensing Engineer

E. F. Trainor, Manager, Quality Assurance Department

The scope and findings of the inspection were summarized. Management comments were for clarification or acknowledgement of the statements made.