

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

Report No. 99900510/79-02

Program No. 51200

Company: United Engineers & Constructors, Inc.
30 South 17th Street
Philadelphia, Pennsylvania 19101

Inspection Conducted: May 21-25, 1979

Inspectors:

J. R. Costello
J. R. Costello, Principal Inspector
Vendor Inspection Branch

6/13/79
Date

J. R. Costello for D. S. Anderson
D. G. Anderson, Principal Inspector
Vendor Inspection Branch

6/13/79
Date

Approved by:

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

6-13-79
Date

Summary

Inspection on May 21-25, 1979 (9900510/79-02)

Areas Inspected: Implementation of 10 CFR 50, Appendix B, criteria in the areas of design verification, design inspection, and action on previous inspection findings. The inspection involved sixty-four (64) hours on site by two (2) USNRC inspectors.

Results: In the three (3) areas inspected one (1) deviation and one (1) unresolved item were identified in two (2) areas. No deviations or unresolved items were identified in the other area.

Deviation: Design Inspection - Contrary to Chapter 17.1.3 (Design Control) of the WPPSS-PSAR, a specification for the Borated Water Storage Tank and the Demineralized Water Storage Tank contained seismic response spectra which had been superseded.

Unresolved Item: Design Verification - It is not apparent who is to maintain the Design Review Control Logs, how much detail is to be maintained in the logs and how to determine when a management level design review is complete.

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Details Section I

(Prepared by J. R. Costello)

A. Persons Contacted

C. J. Bordo, Engineer
D. D. Boyle, Assistant Project Engineering Manager
W. C. Carney, Assistant Supervisor Vendor Surveillance
H. E. Flora, Supervising Nuclear Engineer
S. G. Kasturi, Supervising Instrumentation and Control Engineer
R. H. Marsh, Manager Quality Services
W. R. Morrison, Supervising Engineer Vendor Surveillance
G. J. Neuberger, Administrator Foreign Print Group
J. J. Parisano, Supervising Piping Engineer
W. B. Pauling, Supervising Mechanical Services Engineer
W. B. Robinson, Supervising Electrical Engineer
J. A. Talvacchio, Electrical Engineer

B. Action on Previous Inspection Findings

1. (Open) Deviation (Report No. 78-04): Contrary to 10 CFR 50, Appendix B, Criterion XVII, and WNP-1 PSAR some vendor drawings were not reviewed by the UE&C Reliability and Quality Assurance Department. This method of not reviewing all drawings for inclusion of quality requirements appears to be inconsistent with NRC requirements and has been forwarded to NRR:QAB as an item for further consideration.
2. (Closed) Unresolved Item (Report No. 79-01): It is not apparent whether the Vendor Surveillance Representative is verifying that the applicable procedures submitted to UE&C have been reviewed and approved as required in Section A of the UE&C Vendor Surveillance Check Plan. The inspector verified that records were available at UE&C showing that the inspectors had reviewed and approved the procedures as required for Ingersoll Rand, Dresser Industries and Gould Pumps which could not be verified in the previous inspection. In order to prevent similar problems in the future UE&C has revised WPPSS Quality Assurance Procedure QA-7-2 making it mandatory to date the submittal of sections of the Vendor Surveillance Check Plan and to identify the items covered. Also, UE&C has scheduled a training seminar for the vendor surveillance people which will cover in detail the proper method of filling out the Vendor Surveillance Check Plans.

C. Design Verification1. Objectives

The objectives of this area of the inspection were to determine that procedures have been established and are being implemented that:

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- a. Identify individuals or groups who are authorized to perform design verification reviews.
- b. Require the results of the design verification effort to be clearly documented, with the identification of the verifier clearly indicated, and filed so they are identifiable to the document reviewed and can readily be retrieved.
- c. Require that the extent of design verification take into consideration the importance to safety, complexity, degree of standardization, state of the art, similarity with previously proven designs, applicability of standardized or previously proven designs, known problems and their effects, and changes to previously verified designs.
- d. Identify and document the method by which design verification is to be performed.
- e. Identify the items to be considered during design verification by reviews including selection and incorporation of inputs, necessary assumptions, quality and QA requirements, codes, standards, regulations, construction and operating experience, interfaces, design method used, comparison of output with input, item application suitability, material compatibility, and maintenance features.

2. Method of Accomplishment

The preceding objectives were accomplished by an examination of:

- a. Chapter 17 of the Preliminary Safety Analysis Report (PSAR) for Seabrook Station Units 1 and 2.
- b. Implementing procedures to satisfy PSAR Quality Assurance Program commitments and to satisfy the intent of the objectives section. These procedures are:
 - (1) General Engineering and Design Procedure GEDP-0022, Revision 4, Project Level Design Review and Design Specifications.
 - (2) General Engineering and Design Procedure GEDP-0025, Revision 2, Management Level Design Review by Chief Discipline Engineers.
 - (3) Quality Assurance Procedure QA-3, Revision 10, Design Control for Seabrook Station.
 - (4) Quality Assurance Corporate Standard No. III-1, Revision 4, Design Control.

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- (5) Seabrook Station Administrative Procedure No. 21, Revision 2, Conduct of Design Reviews.
 - (5) Seabrook Station Administrative Procedure No. 28, Revision 3, General Engineering and Design Procedures (GEDPs).
- c. Documents to verify implementation of PSAR Quality Assurance Program commitments and to satisfy the intent of the objectives section. The documents are as follows:
- (1) Design Review Control Logs for Mechanical, Mechanical Services, Instrumentation and Control, Nuclear, and Structural disciplines.
 - (2) Management Level Design Review Status Reports dated March 8, 1979; October 27, 1978; September 29, 1978; June 27, 1975; and May 30, 1975.
 - (3) System Description Master Index - Seabrook Generating Station, May 14, 1979.
 - (4) Design Reviews:
 - (a) Post-LOCA Combustible Gas Control
 - (b) Service Water and Ultimate Heat Sink
 - (c) Control and Diesel Generator Building
 - (d) Combustible Gas Control System
 - Part 1 - Post LOCA Hydrogen Control System
 - Part 2 - Hydrogen Recombiner Specification
 - (e) Containment Building General Arrangement Drawings
 - (f) Containment Cooling System
 - (5) System Design Descriptions:
 - (a) SD-23, Primary Component Cooling Water System
 - (b) SD-29, Combustible Gas Control System
 - (c) SD-33, Radioactive Gaseous Waste System
 - (d) SD-47, Diesel Generator System Heating and Ventilating System

- (e) SD-76, Diesel Generator (Electrical)
- (f) SD-92, Seismic Monitoring
- (5) Specifications:
 - (a) 9763-006-3-1, Containment Shell Rebar Model
 - (b) 9763-006-205-3, Hydrogen Recombiner Post-LOCA Application Non-Inerted Containment
 - (c) 9763-006-248-8, Pipe Supports
 - (d) 9763-006-283-3, Containment Spray System and Fuel Pool Pumps
- (6) Drawings:
 - (a) 9763-F805005, Reactor Coolant System, Loop No. 3
 - (b) 9763-F-805023, Containment Spray System
 - (c) 9763-805554, Reactor Coolant System Loop Piping Arrangement
 - (d) 9763-F-202069 & 202070, Diesel Generator Building Plans above Grade General Arrangement

3. Findings

Deviations

In this area of inspection, no deviations from commitment were identified.

Unresolved Item

It is not apparent who is to maintain the Design Review Control Logs, how much detail is to be maintained in the logs and how to determine when a Management Level Design Review is complete.

Administrative Procedure No. 21 (Seabrook Station) and General Engineering and Design Procedure GEDP-0025 appear to be in conflict on whether the design disciplines or the Document Control Center will maintain the Design Review Control Logs. Examination of Design Review Control Logs in the Document Control Center show

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varying degrees of completeness in filling out the entries on the log. Examination of Design Review Requests (DRRs) taken from Design Review Control Logs show some DRRs approved with comments, but there was no way to determine when or if the comments were incorporated to complete the design review.

D. Exit Meeting

A meeting was conducted with management representatives at the conclusion of the inspection on May 25, 1979. In addition to the individuals indicated by an asterisk in the Details Sections, those in attendance were:

- L. Bilk, Chief Electrical Engineer, Power
- T. C. Chang, Mechanical Engineer
- G. F. Cole, Project Manager
- D. H. Rhoads, Project Engineering Manager
- K. C. Robertson, Project Operations and Controls Manager
- D. J. Stride, Project Administrator
- R. J. Vurpillat, Assistant Department Manager Reliability and Quality Assurance

The inspector, with the assistance of the other inspection team member, summarized the scope and findings of the inspection for those present at the meeting. Particular emphasis was placed on securing proper corrective and preventive action for the design inspection deviation identified during this inspection. Management representatives acknowledged the statements of the inspectors.

Details Section II

(Prepared by D. G. Anderson)

A. Persons Contacted

R. M. Anzalone, Acting Supervising Mechanical Engineer
 J. S. Booi, Group Leader
 *M. Botshon, Assistant Project Engineering Manager
 J. R. Browning, Structural Engineer
 E. W. Hageman, Supervising Piping Engineer
 R. P. Harris, Stress Analyst
 B. J. Huselton, Project Engineering Manager
 J. J. Jones, Piping Design Supervisor
 *R. H. Leonard, Assistant Department Manager
 M. P. McKenna, Assistant Pipe Support Manager
 Z. B. Olszewski, Supervising Mechanical Analysis Engineer
 Dr. R. F. Perry, Manager, Mechanical Analysis
 G. Rigamonti, Assistant Chief, Power Engineering
 B. B. Scott, Supervising Structural Engineer
 E. Skolnick, Lead Engineer
 J. J. Ucciferro, Manager, Structural Analysis
 *G. Valentyeni, Assistant Project Engineering Manager

*Indicates attendance at the exit meeting.

B. Design Inspection1. 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.

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- d. 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.
- i. 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 as follows:

- a. A review of the Preliminary Safety Analysis Report for Washington Public Power Supply Systems (WPPSS) Units 1 and 4, Section 17.1.3, Design Control, which identifies the requirements imposed upon United Engineers and Constructors, Inc. (UE&C) related to the design process. The design process related to the WPPSS project is defined, implemented and enforced according to the following procedures:

Project Procedures (WPPSS) PP#5, Specification Preparation, September 12, 1978; PP#8, Control, Preparation, Revision and Distribution of Project Procedures, April 21, 1978; PP#9, Maintenance of Controlled Manuals, June 28, 1978; PP#10, Vendor Document Control, October 18, 1978; PP#11, Design Data Worksheet, October 2 1975; PP#14, Project Level Design Review Procedures, July 10, 1978; PP#16, Calculations, April 29, 1976; PP#18, Project Change Request, March 23, 1979; PP#20, Interface Procedures for Analysis and Support Groups, May 7, 1975; PP#21, Drawing Practices and Approvals, August 14, 1978; PP#22, Specification, Systems and Equipment Abbreviations Lists, January 11, 1979; PP#25, Seismic Qualification of Purchased Components, June 4, 1974; PP#28, System Descriptions, March 29, 1976; PP#31, Control of Licensing Document Commitments, September 22, 1975; PP# 32, Control of Licensing Document Deviations, February 25, 1976; and PP#37, Request for Engineering Information, July 12, 1978.

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- b. The inspector selected the main feedwater system and the auxiliary feedwater system for WPPSS #1 (Babcock and Wilcox Pressurized Water Reactor) and reviewed the following documents for design input:
- (1) Project Conceptual Description, WPPSS, Nuclear Projects No. 1 and 4, which included structural design criteria, and Section 6.0, Seismic Loads, September 30, 1974.
 - (2) System Descriptions;
 - 9779-S-M-4, Auxiliary Feedwater System (FWA), January 7, 1976.
 - 9779-S-M-5, Main Feedwater System (FWS), September 28, 1978.
- c. The inspector compared the input in b. above with that contained in the WPPSS-PSAR, Unit No. 1, Volume 6, Section 10.4.7, Condensate and Feedwater Systems, and Section 3.7, Seismic Design.
- d. The inspector reviewed the design calculations which produced the inputs identified in b. above in the following:
- (1) Calculations:
 - SAG 3.5.1.1, Seismic Analysis Including Floor Response Spectra, contained in the December 20, 1974, and April 2, 1975, computer printouts.
 - SAG 3.7, Main Steam and Feedwater Isolation Valves, dated October 10, 1975, October 1, 1975, December 21, 1977, and October 13, 1975.
 - (2) Piping Isometrics:
 - 9779-F-422363, Main Steam System and Feedwater System Isolation Building Isometric, March 16, 1979.
 - 9779-F-422362, Turbine Generator Building Piping Isometric Feedwater System, April 13, 1979.
- e. The design verification process was reviewed in the following documents:
- (1) Drawings:
 - 9779-S-202540, Process and Instrumentation Diagram-Main Feedwater System, January 3, 1979.

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9779-S-202541, Process and Instrumentation Diagram-Auxiliary Feedwater System, December 18, 1978.

The inspector verified that these drawings were the same as those in Section 3.2 of the WPPSS/PSAR.

(2) Computer Codes:

RESPECT- A Fortran IV computer program used to compute response spectra from digitized acceleration time-history input.

SAG019, Users guide for RESPECT.

SAG019, Verification runs-input/output compared to CDC-DYNRE5/STARDYNE computer codes, December 8, 1978.

DGRS-A Fortran IV computer program used to compute design ground response spectra in accordance with Regulatory Guide 1.60.

SAG027-Verification of DGRS by hand calculation May 2, 1979.

f. The inspector verified the process for changes to the design in the following documents:

Project Change Requests (PCR):

PCR No. 30, Change in anchor bolt requirements, April 9, 1976.

PCR No. 51, Demineralized Water Storage Tank increase length in eight nozzles, May 23, 1976.

PCR No. 52, PSAR change/Gas waste decay tank automatic isolation valves, May 26, 1976.

PCR No. 58, Change size of main feedwater isolation valves, June 9, 1976.

PCR No, 67, Add feedwater pump characteristic curves, June 28, 1976.

PCR No. 74, Revise nozzle locations on borated water storage tank, June 18, 1976.

PCR No. 94, Steam Generator Isolation valves, June 9, 1976.

PCR No. 121, Delete nitrogen blanket on condensate storage tank, undated.

PCR No. 165, New vertical and horizontal response spectra, October 1, 1976.

- g. The following documents were traced to verify that the document control system is being implemented:
- (1) Topical Report UEC-TR-001-5A, Controlled Copy No. 132.
 - (2) Quality Assurance Manual - Controlled copies No. 1, 84, and 94.
 - (3) Project Procedures - Seabrook controlled copy No. 63 and WPPSS No. 25.
 - (4) Preliminary Safety Analysis Report - Controlled copy No. 15.
- h. UE&C does not have the procurement responsibility for purchase of nuclear components for the WPPSS project, however, the inspector reviewed the following documents used in the procurement process:
- Specifications:
- 9779-10-2, Feedwater Heaters, August 11, 1975.
- 9779-11-A-1, and B-1, Turbine Driven Feedwater Pumps, March 2, 1979.
- 9779-12-5, Feedwater Pump Turbine Drives, December 18, 1978.
- 9779-62-5, Auxiliary Feedwater Pumps, April 11, 1979.
- 9779-87-5, Steam Generator Isolation Valves (Main Feedwater Isolation Valves), June 17, 1976.
- 9779-243-11, Field Fabricated Tanks (including Borated Water Storage Tank (BWST) and Demineralized Water Storage Tank (DWST)), February 3, 1975.

3. Findings

- a. In this area of the inspection, no unresolved items were identified. One (1) deviation from commitment was identified. (See Notice of Deviation enclosure).
- b. The following are details of the deviation identified in the Notice of Deviation.

In reviewing the technical content of Specification No. 243, Field Fabricated Tanks, the inspector noted that the response spectra contained in the figures on pages 20A-16, 17, and 18 of this specification were less conservative than those identified in Calculation No. SAG 3.5.1.1, Seismic Analysis Including Floor

Response Spectra. Since the specification was for the procurement of storage tanks, including the BWST and the DWST, and since these two tanks are the source of supply for the Safety Injection System and the Auxiliary Feedwater System respectively, the inspector followed up on this discrepancy to establish the state of fabrication. It appears that the material for both tanks has been purchased (Welk Brothers Metal Products) and shipped to the WPPSS site. It appears that the reason for this oversight is that these two tanks did not appear on the Seismic Category I listing and when the calculation was revised in April 1975, the revised seismic response spectra was not incorporated into the specification. UE&C has indicated that the BWST and DWST will appear on the next edition of the Category I listing, that the change will be documented, that Specification No. 243 will be revised, and that the supplier will provide a reanalysis of the design of these tanks. UE&C corrective action on this deviation will be followed up in a future inspection. UE&C management was advised by the inspector that NRR/NRC verification of the design reanalysis will be requested.

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