

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

Report No. 99900057/79-02

Program No. 51300

Company: The William Powell Company
Plant No. 2
3233 Colerain Avenue
Cincinnati, Ohio

Inspection Conducted: November 13-15, 1979

Inspector: *Ross L. Brown* 12/7/79
Ross L. Brown, Contractor Inspector
Component Section I
Vendor Inspection Branch
Date

Approved by: *D. E. Whitesell* 12-7-79
for D. E. Whitesell, Chief
Components Section I
Vendor Inspection Branch
Date

Summary

Inspection on November 13-15, 1979 (99900057/79-02)

Areas Inspected: Management meeting and implementation of 10 CFR Part 21 as related to the field reported deficiencies in the valves designed and manufactured by this company. The inspection involved eighteen (18) inspector hours on site by one NRC inspector.

Results: In the areas inspected, no deviations from commitment or unresolved items were identified.

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DETAILS SECTIONA. Persons Contacted

- *H. Knock, QA Manager - Plant #2
- *J. F. Loftus, Corporate Chief Engineer
- *E. E. Winterfeldt, Corporate Manager QA

*Attended exit meeting.

B. Management Meeting1. Objectives

The objectives of this meeting were to accomplish the following:

- a. To meet with the company management and those persons responsible for administration of the QA program and to establish channels of communication.
- b. To determine the extent of the company's involvement in the commercial nuclear business.
- c. To describe the NRC evaluation of the ASME inspection system.
- d. To describe the scope of this inspection, relative to the construction deficiency reported to NRC Region II office by Mississippi Power and Light Co. and the subsequent Part 21 reported to the NRC Region IV office on November 9, 1979, in order to verify conformance with the requirements of 10 CFR 21 and to determine the generic possibility of the identified deficiency (this is covered in Paragraph C).

2. Methods of Accomplishment

The preceding objectives were accomplished by a meeting with those persons identified in Paragraph A on November 13, 1979. The following is a resume of the meeting:

- a. The present VIB organization was described.
- b. The scope and status of the NRC's program for evaluation of the ASME inspection system was described.
- c. The company's contribution to the commercial nuclear industry was discussed including current and projected activity.

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3. Results

The inspector was provided with the following information:

- a. The channels of communications have not changed.
- b. The William Powell Company (WPC) (Docket Numbers 99900057 and 99900269) has contracts for more than seven hundred (700) Class 1, 2 and 3 nuclear valves.
- c. WPC has recently employed persons capable of performing engineering calculations (including seismic analysis) therefore, WPC will not sublet this function in the future.

C. Implementation of 10 CFR Part 21

1. Objectives

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

- a. That the Part 21 report dated November 12, 1979, correctly described the noncompliance to the specification for nuclear valves supplied by WPC to the Mississippi Power and Light Company, Grand Gulf Nuclear Station, Units 1 and 2.
- b. That the deficiency has been reported to all WPC nuclear valve customers.
- c. That the evaluation of the problem included assessment of generic implications.
- d. That WPC has taken actions to correct the deficiency and to prevent recurrence.

2. Methods of Accomplishment

The preceding objectives were accomplished by:

- a. Discussions with WPC management personnel.
- b. Review of Bechtel Design Specification, No. 9645-M-242.0, Revision 0 dated August 13, 1973.
- c. Review of Bechtel Purchase Order, No. 9645-M-242.0, dated December 21, 1973.

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- d. Review of three (3) Seismic Analysis Reports including No. S-86952 for 10 inch 150 pound Gate Valve, Figure No. 1503 WE Air Cylinder Operator. Analysis performed by Midwest Technical Services Incorporated (MTS) Cincinnati, Ohio.
- e. Review of audit report dated May 6, 1974, of MTS.
- f. Review of Approved Controlled Material Suppliers List dated 1976, 1977 and 1978.
- g. Review of MTS letter to WPC dated October 1, 1979, that stated MTS could not identify any problem in their analytical program and they find the program acceptable.
- h. Review of Bechtel's request dated July 5, 1979, requesting a price for performing a reanalysis and retesting of several valves in accordance with the requirements of Appendix Hx, Revision A dated June 22, 1979 to Technical Specification for Job No. 9645.
- i. Review of a chart comparing the Natural Frequency Calculations reported by MTS and Anamet Laboratories, Inc. San Carlos, California.
- j. Review of WPC's Engineering Procedure No. 7609-509A. Reconciliation of Stress Reports.
- k. Review of WPC Engineering Review Log.

3. Findings

The WPC management personnel furnished the inspector with the following summary of activities related to the reported deficiency:

- a. WPC designed the valves in accordance with the Bechtel design specification (9645-M-242.0) that identified the required valves as being seismic Category 1 and to be capable of operation during and after the loadings which occur due to seismic forces. Specifically, the valves, having operators or similar features of extended proportions, shall be able to withstand an inertial load of 3.0g in any direction in addition to normal operating loads. The extended parts of the valve shall have a frequency of vibration greater than 33 cps. Electrical switches or other activating mechanisms shall withstand the inertial load without changing position and accidentally causing change of position of the valve disc.

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- b. MTS was under contract to WPC to conduct the seismic analysis of the valves, and valves with operators, in accordance with the Design Specification 9645-M-242.0 and WPC drawing. This contract was in force from early 1973 to October 1978.
- c. The seismic analysis reports, and other stress reports, were reviewed by WPC. This was verified by a review of the engineering review log, however, a checklist was not used by the reviewer.
- d. The seismic analysis reports were submitted to Bechtel for their review and approval. This was verified by a review of three (3) stress reports, that had the Bechtel approval stamp, and were signed and dated.
- e. The seismic analysis reports included the input requirements specified in the design specification and drawings. This was verified by the inspector.
- f. The Appendix Hx, Revision A to the design specification 9645-M-242.0 required the following increases in the loading and natural frequency:
 - (1) Valve - 100 Hz.
 - (2) Valve Assemblies with Electric Motor Operators 6g and 100 Hz.
 - (3) Valve Assemblies with Pneumatic Operators 6g and 100 Hz.
- g. In August 1979, Bechtel questioned the qualifying seismic reports. It was during the WPC reanalysis of these reports that the possible deficiency was identified.
- h. WPC contracted Anamet to perform seismic analysis of these valve assemblies (valves plus valve operators), using the same information (specifications and drawing), supplied to MTS. This analytical work revealed that the valves identified in the Part 21 Report, would not achieve the seismic requirements of the design specification of 3.0g, and a natural frequency of 33 cps.
- i. The chart showing the comparison between the MTS and the Anamet Values, indicate an error factor of from 4.9 to 10.
- j. The WPC management stated that the reanalysis of all seismic computations performed by MTS will be completed in January 1980. At which time WPC will notify their customers of any errors in the reported values, and revised reports will be submitted.

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- k. The WPC management stated that the reanalysis performed to date does not indicate any errors in the analysis of the valve proper, therefore the pressure retaining capabilities of the valves would not be violated. The failure would result in a malfunction of the valve due to the deformation or failure of the yoke arm that attaches the valve operator to the valve bonnet.
- l. WPC had testing conducted by University of Cincinnati, Department of Mechanical Engineering, which verified the accuracy of the analytical work performed by Anamet. These tests were conducted using the Modal Analysis method (Impluse Technique).

WPC will have the University of Cincinnati conduct similar tests to verify the adequacy of any new designs, or any significant changes of existing designs.

- m. The WPC Engineering Procedure 7609-509A identifies the items that are to be checked during the review of the stress reports and it assigns the responsibilities for the activity.
- n. The changes which will be required to strengthen the yoke arm of the valves in question has not been determined.
- o. The action to be taken in Paragraph C.3.1 and m will prevent recurrence of similar problems.
- p. WPC will attempt to determine the cause of the error when the reanalyses have been completed and appropriate corrective action determined. WPC will submit a final report to the NRC at this time.

No deviations or unresolved items were identified in this area of the inspection.

D. Exit Interview

The inspector conducted an exit meeting with the WPC management representatives identified in Paragraph A and Mr. P. Niehaus, Vice President of Engineering and Manufacturing, at the conclusion of the inspection.

The inspector discussed the scope of the inspection and the details of the verbal commitments made by the company representatives during the inspection.

The inspector informed the company representatives that WPC is obligated to supply the NRC with a final report that includes as a minimum the cause (if known), a list of nuclear facilities involved, actions taken to correct the deficiency and corrective actions taken to prevent recurrence.

The inspector also stated that it appears that the company has complied with the requirements of 10 CFR Part 21.

The inspector discussed the NRC method of reporting and informed those present that WPC will receive a copy of the inspection report for their review for any proprietary information. They were also informed how to transmit any information they wish deleted.

The company representatives acknowledged the statements by the inspector and their comments were for clarification only.

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