

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

Report No. 99900345/80-01

Program No. 51300

Company: Hayward Tyler Pump Company
Division of Stone Plant
Burlington, Vermont 05401

Inspection Conducted: February 25-27, 1980

Inspectors: *Ross L. Brown* 3/17/80
Date
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Components Section I
Vendor Inspection Branch

D. E. Whitesell 03/14/80
Date
D. E. Whitesell, Chief
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Summary

Inspection on February 25-27, 1980 (99900345/80-01)

Areas Inspected: Implementation of 10 CFR 50, Appendix B, including special inspection related to reported construction deficiencies and allegations of disregard for product safety. The inspection involved forty (40) inspector hours on-site by two (2) NRC inspectors.

Results: In the areas inspected there were no unresolved items identified in any of the areas, no deviations were identified in two (2) of the areas, and the following deviation was identified in the remaining area.

Deviation: The cause and corrective action item of Nonconformity Reports had not been filled in as required (See Notice of Deviation enclosure).

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DETAILS SECTION

(Prepared by Ross. L. Brown and D. E. Whitesell)

A. Persons Contacted

- *D. W. Chalmers, President
- *R. C. Groeschel, Quality Assurance Manager
- *S. E. Bushey, Quality Control Supervisor

*Attended Exit Interview.

B. Inspections Related to the Allegations of Disregard for Product Safety1. Background

The NRC Region I office received from the state of Vermont, Department of Labor and Industry a letter forwarding a copy of allegations filed with that office. Four items identified as signifying disregard for nuclear product safety were referred to the Vendor Inspection Branch for investigation. These items are as follows:

- a. Quality Level 1 parts have been machined even though the parts were on conditional hold not to be released for machining until inspected by an A. I. inspector.
- b. Skipping N. D. T. tests on a job route sheet. Because it would mean breaking down the set-up resulting in lost machining time, then testing for defects, then setting the part back on the machine. Liquid penetrate tests are to be done in proper order according to a level I route sheet and not to be changed.
- c. Quality inspection have not been followed according to level I standards. The Hayward Tyler in house inspectors reject parts, then they are over-ridden by Hayward Tyler management to use as is.
- d. Hayward Tyler Pump Management has modified contract prints and parts dimensions to allow for their misjudgements when in fact changes were only to be made by the customer.

The enclosure also included several items relative to the health and safety of the plant and equipment. The inspector did not inspect these items, but was informed that these items were looked at by the Vermont office of safety and health.

The inspector selected the following two (2) inspection modules to be used for the inspection effort relative to these allegations: Manufacturing Process Control and Control of Nonconformances and Corrective Action.

2. Manufacturing Process Control

a. Objectives

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

- (1) The manufacturer operates under a controlled system using process sheets or equivalent for all operations including inspections pertinent to component production.
- (2) The system requires all processes and examination/tests to be performed by qualified personnel using qualified procedures.
- (3) The process sheets are required to be prepared including document number and revisions to which production and examinations must be performed.
- (4) The process sheets include provisions for the identification of hold/witness points and signoff and date.

b. Method of Accomplishment

The preceding objectives were accomplished by a detailed review of:

- (1) Hayward Tyler Pump Company (HTPC) Quality Assurance Manual (QAM), Section 10, Process Control.
- (2) Customer Specification for Contract No. 3240-116H. (HTPC Job No's 8108/8107).
- (3) Engineering Standard, Section 3.0.6/4-1, Quality Grid.
- (4) Route Sheets for Job No's. 8108, 8049, and 8050.

- (5) Master Route Sheets for Mechanical Seal Gland Plate, Back Cover, Casing Upgrading and Casing Machining.

c. Findings

No deviations from commitment or unresolved items were identified in this area of the inspection. The inspector verified the following information:

- (1) The customer specification includes the following submittal requirement: QAM, Route sheets for determination of inspection points, and documentation for approval.
- (2) The Quality Grid standard governs the quality requirements for all pumps and pump parts. The standard describes the six levels of quality, with level 1 having the most requirements. It also assigns Quality Level 1 as applicable to ASME Code Section III Class 2 and 3 pumps.
- (3) The QAM states in part: All manufacturing shall be controlled by Route Sheets which shall travel with the material throughout the many sequences; the route sheets shall include the HTPC, customer and Authorized Nuclear Inspectors inspection, witness or hold points.

The manual also states the following operations shall not be performed out of sequence; all Inspection and QA operations and examinations, all hold and witness points, all tests, including Hydrostatic Test, Performance Tests, and Balancing, all welding and welding-related operations, including excavations, allocation of welding material, and repair mapping and all cleaning, assembly, and packaging operations.

The QAM further states that machining operations may be performed in any logical sequence.

- (4) The Route Sheets includes as a minimum, the job number, part name, drawing number, quality level, operation sequence numbers, operation sequence, route sheet approvals, operation and inspection sign-offs, and dated as appropriate by HTPC, ANI and customer procedure

numbers, and references inspection reports and nonconformity reports. No irregularities were noted during the review of the route sheets for the job selected.

3. Control of Nonconformances and Corrective Action

a. Objectives

The objectives of this area of the inspection were to verify that procedures have been established and implemented for:

- (1) Disposition of nonconformances that provide for:
 - (a) The control of nonconforming materials, parts, or components to prevent their inadvertent use or installation.
 - (b) Identification, documentation, segregation, and disposition of nonconforming items and notification to affected organizations.
- (2) Corrective action that provides for:
 - (a) Review and evaluation of conditions adverse to quality to determine the cause, extent, and measures needed to correct and prevent recurrence.
 - (b) Reporting these conditions and the corrective action to management.
 - (c) Assuring that corrective action is implemented and maintained.

b. Method of Accomplishment

The above objectives were accomplished by a review of the following documents:

- (1) QAM, Section 16.0, Nonconformities and Corrective Action.
- (2) Nonconformity Report (NCR) No's. B0033, B0038, B1195, B1194, B1199 and B1202.

- (3) Periodic Review of Audit Reports dated April 4, 1979, August 29, 1978 and November 6, 1979.
- (4) Internal Memorandum, dated February 27, 1980, Subject: NCR's and Corrective Action.
- (5) Internal Audit Report Date February 27, 1980.

c. Findings

(1) Unresolved Item

No unresolved items were identified.

(2) Deviation

One deviation from commitment was identified (See Notice of Deviation, enclosure).

The internal audit report (B.3.b.5) and the internal memorandum (B.3.b.4) describes the action to be taken: to correct the deficiencies, to prevent recurrence and states the completion date for each activity. Therefore this deviation is considered closed.

(3) The inspector verified implementation of the following requirements;

- (a) The QAM provides for the identification, documentation, and disposition of nonconforming items.

The manual also provides for the review of conditions adverse to quality to determine the cause and actions to be taken to prevent recurrence, it also requires followup audit to verify implementation of the specified actions.

- (b) Except the deviation described in the Notice of Deviation, the NCR's reviewed were in accordance with specified requirements, relative to identification, disposition and appropriate approvals (always the Project Engineer and Quality Assurance Manager).

4. Conclusion

The inspector was not able to verify the validity of the allegations identified in Paragraph B.1. above.

C. Reported Construction Deficiencies

1. Background Information

On January 17, 1980 the licensee verbally notified the NRC Resident Inspector at Comanche Peak, that the Hayward Tyler Pump Company (HTPC) had informed them that one of the 4 safety related Service Water Pumps, contain potential construction deficiencies as follows:

- a. The material of one of the shaft split coupling rings could not be identified and the pedigree traceable to ensure compliance with contract requirements, and
- b. A possibility that a bottom bearing lubrication hole had not been drilled in the shafts of one, and perhaps, two of the pumps.

The licensee plans to evaluate these possible deficiencies in compliance with 50.55(e).

2. Objective

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

- a. Were these potential construction deficiencies the results of a breakdown in the Vendor's QA program;
- b. What corrective action has been, or will be taken;
- c. What steps have or will be taken to prevent recurrence;
- d. The generic impact; and
- e. Is the problem reportable under 10 CFR 21.

3. Method of Accomplishment

The foregoing objectives were accomplished by:

- a. Review of the customer's Purchase Order (PO) number CP-0010, dated July 28, 1975, Revision 3, dated December 9, 1977; and Design Specification (DS) number 2323-MS-10, Revision 1

dated December 9, 1977; and Design Specification (DS) number 2323-GS-903, with Appendix 3, to ascertain the governing code edition and addenda, the Code Class and Seismic category, and quantity of the Service Water Pumps. Also to ascertain what QA requirements were imposed on the vendor to control the design, manufacture, inspection and tests of these pumps.

- b. Review of Drawing numbers 01-600-061 Revision A, dated August 7, 1978, titled "Sectional Arrangement;" 71-320-289, dated April 18, 1977, Revision A, dated December 13, 1977, titled Machining "Split Coupling Ring;" to ascertain whether the material specified for the split coupling ring, was in compliance with the contract documents.
- c. Review of the Master Material Bill for Contract number 2-0173-8173, and pump S/N 8174-01&02 for Comanche Peak Unit 1; and S/N 8175-01&02 for Unit 2. To ascertain the part number (PN) of the split coupling ring (P/N 5703), and to verify that the type of material specified was ASTM B164 Class A (monel), as identified on the drawing.
- d. Design and Seismic Analysis Report Number 01-007-005, dated October 28, 1977 to verify that the allowable material stress used complied with the allowable design stress as identified in appropriate ASME Tables for the material type and grade to be used in the manufacture of the pump parts. Also to verify that the minimum dimensions identified on the drawings were supported by the design and earthquake analysis.
- e. Review of the "as built" drawing number 01-400-389 to verify that the callout for the three split coupling rings on each of the four (4) service water pumps, were identified as being ASTM B164 Class A.
- f. Review of the data package for pump No. 8174-01 containing the following:
 - (1) Gibbs and Hill QA Release No. 2463 dated September 24, 1978, Final Inspection for Shipment. Signed TUGCO QA inspector dated September 29, 1978.
 - (2) Data Report, signed by the ANI, NB No. 7569 on September 28, 1978.
 - (3) Facsimile of plate and Stamp for 8174-01.
 - (4) Performance curve No. 7308-5001 Test No. 265.04 for pump No. 8174-01 to demonstrate capability to meet design specification of 17000 GPM at 140 ft. head.

- (5) Work sheet of test results from which the performance curve was plotted.
 - (6) Hydrostatic Test Report dated August 25, 1978 for pump No. 8174-01 to verify that the test procedure was identified, the test pressure and holding time was recorded, and the test pressure was 1.5x the design pressure. Also to verify that the ANI had witnessed the test and found the item acceptable.
 - (7) The "As Built" Master Material Bill Tabulation for J/N 8174-01, to verify the material identified for item 5703 (split ring coupling) was identified in accordance with the as built drawings No. 01-400-389.
 - (8) CMTR from Huntington Alloy, dated October 3, 1975, for ASTM B164, Class A, for a 6.5" diameter x 720.00" Bar; Heat number M15084B.
 - (9) Certification of Test dated July 12, 1978 by Canadian Forging identifying the physical properties of Heat No. M150840.
 - (10) Inspection Report dated September 28, 1978 of the dimensional verification of split ring shaft coupling. Identified nonconforming dimension tolerances.
 - (11) Nonconformance Report No. B0033 dated September 28, 1978 which described the nonconforming dimension tolerances and was dispositioned to "use as is" and had been appropriately reviewed for disposition concurrence in the manner prescribed. It was observed that the cause was identified as a machining error, and not repeatable, therefore no action to prevent recurrence was required.
- g. Discussions with the cognizant HTPC engineers and managers concerning the deficiencies identified, and reported by them, to both the customer, and NRC in compliance with 10 CFR 21.

4. Findings

From the discussions and the pertinent QA/QC documents reviewed, the following determinations were made:

- a. The contracts for the four 24VSN Verticle two stage service water pumps was initially let to Babcock Wilcox Pump Co. in Cambridge Canada, and was identified as BW Gault, Contract

number 2-0173-8173, and later transferred by B&W, with the concurrence of the buyer, to Hayward Tyler Pump Company (HTPC) in Burlington, Vermont. Under the initial contract B&W was responsible for the design of the pumps, and had accomplished the following work on the contract, prior to the date of transfer.

- (1) Prepared the pump design and machining drawings, procured material for the manufacture of the following items for the first pump.
 - (a) First and second stage pump housings,
 - (b) First and second stage impellers, and
 - (c) Shaft with one split ring coupling to connect the drive shaft of the motor, and had performed a test to determine whether the pump, as designed, would achieve the specified capacity and head
 - (2) Hayward Tyler Pump Co., as subcontractors to B&W Gault, had performed the Design Calculations and Seismic Analysis Report for the first pump.
 - (3) Upon completion of the test by B&W, the responsibilities for the balance of the contract was transferred to HTPC.
- b. HTPC upon receipt of the contract, assigned job number 8174 for Comanche Peak Unit one pumps and job number 8175 for the Unit 2 pumps.
 - c. The title blocks of the B&W drawings were voided and HTPC title block added, and HTPC accepted the responsibilities for updating and revising the drawings as necessary to accommodate engineering change notices (ECN) and/or revisions to the buyer's PO.
 - d. The items manufactured by B&W were received by HTPC, disassembled and each item assigned a unique batch number which identified the part as having been manufactured by B&W.
 - e. The pumps for Comanche Peak 1 was assembled and shipped. All the materials used by B&W for the items manufactured by B&W were traceable to CMTR except the split coupling ring manufactured by B&W to connect the impeller shaft to the drive motor.

- f. The assigned Project Engineer, reported to the Manager of QA in July of 1979 that they did not have documents which provide the pedigree of the split ring material. Both HTPC and B&W searched for such traceability and in January concluded that a replacement split coupling ring should be installed, and on January 16, 1980, JWX 9108908660 was sent to TUGCO reporting that there was no evidence to ensure that the split ring material met contract specifications.
- g. The TWX also identified that the lubrication holes may not have been drilled in the shaft manufactured by B&W for the two stage performance test, and requested any installation work on the pumps to be halted until HTPC could install the replacement part and inspect the pumps to determine what other rework may be required.
- h. HTPC manufactured a replacement split ring from traceable material and a service crew was dispatched to the site to replace the suspect split ring, and rework the lube holes as necessary.
- i. The service crew reported that only one of the two radial lube holes had been drilled in the shaft of pump number 8174-01. The shafts of the remaining three pumps had been properly drilled to lubricate the bottom bearings of the first stage pumps.
- j. No breakdown in the HTPC QA program was identified. Concerning the split ring coupling, the lack of material identification was apparently due to lost documents during the transfer of contract, and the oversight of the lube holes appears to be partially a lack of communication, and also the lack of specific instructions to the receiving inspector concerning receipt of the pumps from B&W. This could be considered a deviation, however due to the unique circumstance, the corrective action taken a citation after the fact does not appear to be warranted.
- k. The corrective action was to replace the unidentified split coupling ring with one of material which is traceable, and drill the second radial lube hole in the shaft of pump no. 8174-01. As part of the corrective action, it was verified that HTPC, had issued a requisition to purchasing to send the split-ring with unidentified material to a laboratory for analysis to ascertain whether the material was conform as specified.

- l. Since the problem was created in the confusion of the transfer of the contract from B&W, Cambridge, Canada to HTPC. The problem is an isolated case and not repeatable. Therefore corrective action to prevent recurrence is not required.
- m. The problem is unique with Comanche Peak and not generic.
- n. The service water pumps were identified as safety related; and both the customer and NRC were appropriately notified in accordance with HTPC procedure No. 8.3.0/1-0 dated January 4, 1978, developed by HTPC to be responsive to 10 CFR 21.

D. Exit Interview

The inspector conducted an exit meeting with the Hayward Tyler Pump Company management representative at the conclusion of the inspection. Those persons indicated by an asterisk in Paragraph A, were in attendance. In addition, the following were present:

R. W. McMillan, Quality Assurance Engineer
R. M. Kleckner, Consultant
R. A. Gosser, Authorized Nuclear Inspector, Kemper Insurance Companies
(Lumbermans Mutual)

The inspectors discussed the scope of the inspection and the details of the findings identified during the inspection.

The inspector stated that the identified deviation will not require a response because the corrective action and preventative measures were taken prior to the conclusion of the inspection.

The HTPC management's comments were for clarification only.