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

Report No. 99900056/80-01 Program No. 51300

Company: Henry Pratt Company
401 S. Highland Avenue
Aurora, Illinois 60507

Inspection at: Dixon and Aurora Plants

Inspector: R E Oller 8-22-80
R. E. Oller, Contractor Inspector Date
Components Section II
Vendor Inspection Branch

Approved by: I Barnes 8-22-80
I. Barnes, Chief Date
Components Section II
Vendor Inspection Branch

Summary

Inspection on July 28 - August 1, 1980 (99900056/80-01)

Areas Inspected: Implementation of 10 CFR 50, Appendix B criteria and applicable codes and standards including: action on previous inspection findings, review of vendor activities, internal audits, manufacturing process control, welder qualifications, qualification of NDE personnel, and followup to assess the cause, corrective action and generic considerations relative to a 10 CFR 50.55(e) reported deficiency involving the loss of a locking key in a coupling between a Henry Pratt butterfly valve and a Bettis actuator at Sequoyah Unit 1. The inspection involved 26 inspector-hours on site.

Results: In the seven (7) areas inspected, no deviations or unresolved items were identified. The following was identified.

Action with regard to the Tennessee Valley Authority (TVA) Reported 10 CFR 50.58(e) Deficiency

TVA reported by telephone and by written report to the NRC OIE, that a Sequoyah Unit 1 containment isolation valve because inoperable when the key which locks the G. H. Bettis actuator to the stem of the valve fell out. This problem could be generic to similar valves and actuators installed upside down or sideways.

The keys were furnished by Henry Pratt Company (HPCo). HPCo indicated that the loss of key in the Sequoyah Unit 1 valve appeared to be an isolated case. However, in the interest of safety, HPCo notified, in addition to TVA Sequoyah Units 1 and 2, 18 other affected utilities and applicable nuclear units of the potential problem. HPCo requested that valves furnished by HPCo be reviewed for actuator orientation, and that valves with similar orientations to the problem valve be checked for engagement of the valve shaft key to drive sleeve. As an additional safeguard HPCo recommended three (3) alternate field modifications to the locking key. HPCo also furnished information to the NRC OIE Headquarters. IE Circular No. 80-12 was subsequently issued on May 14, 1980. (Report Details, paragraph J.)

DETAILS SECTION

A. Persons Contacted

*A. Wilson, Vice President and Manager of Engineering
*B. Cummins, QA Manager
J. Taylor, Quality Engineer
E. Wolber, Chief Inspector
*T. Wrona, Manager Contract and Proposal Engineering
H. Yoan, Welding Engineer

*Attended the Exit Meeting.

B. A meeting was held on July 29, 1980, with the QA Manager. The NRC inspector discussed the areas planned for inspection and set a time for the post inspection exit interview.

C. Action on Previous Inspection Finding

(Closed) Unresolved Item (Report 79-01): Reported 10 CFR Part 21 Deficiency with regard to ASCO solenoid valves in Bettis actuators used on Henry Pratt Company (HPCo) 36" butterfly valves supplied for Three Mile Island Unit 2. At the time of the inspection at HPCo, June 25 and 29, 1979, further evaluation and reporting by HPCo appeared necessary prior to completion of the followup inspection on HPCo's Part 21 Report. The NRC inspector found that HPCo had submitted a final report, dated August 20, 1979, to the USNRC OIE. This report supplimented and amended HPCo's original report dated April 10, 1979. It identified additional ASCO model solenoid valves which contained the suspect plastic parts, and included a list of affected power plants and equipment.

The amended corrective action was that HPCo would notify by September 15, 1979, the power plants listed therein, of the potential defect for their review and evaluation as related to safely impact. The notifications would also include information about currently qualified solenoid valves which the power plants could use in taking corrective action. Additional review verified that HPCo had sent a letter, dated August 20, 1979, to each affected nuclear power plant identified in HPCo's final report, dated August 14, 1979, to the NRC. In each letter, the affected equipment was identified and a copy of HPCo's August 14, 1979, final report was attached. The final report covered the subjects of: Potential Defects, Evaluation, Discussion and Proposal.

D. Review of Vendor's Activities

1. Objective

The objective of this area of the inspection was to assess the vendor's activities and their impact on future NRC inspections.

2. Method of Accomplishment

The preceding objective was accomplished by:

a. Discussions with cognizant personnel concerning in-process domestic and foreign valve orders.

b. Review of the following ASME Certificates of Authorization:

(1) No. N-1030 authorization to use the "N" symbol for stamping of Class 1, 2, and 3 valves.

(2) No. N-1031; authorization to use the "NPT" ymbol for stamping of Class 1, 2, and 3 valve parts and appurtenances.

Both of these authorizations expire on May 6, 1981.

c. Observation of in-process valve work.

3. Findings

a. Within this area of the inspection no deviations or unresolved items were identified.

b. Currently ASME Code valve work in-process or just completed is limited to valves for four (4) domestic jobs. One domestic valve job has not been released to production.

c. HPCo holds valid ASME "N" and "NPT" authorizations to manufacture Class 1, 2, and 3 valves, and valve parts and appertenances.

E. Nonconformances and Corrective Action

1. Objectives

The objectives of this area of the inspection were to verify that the following items were controlled in accordance with applicable NRC and ASME Code requirements.

a. A written system has been established to assure that nonconformances are controlled and corrective action is taken.

b. Documented procedures or instructions are implemented for identification, documentation, segregation and disposition of nonconforming materials parts or components, and notification to affected organizations.

c. Nonconforming items are reviewed and accepted, rejected, repaired or reworked in accordance with documented procedures.

d. Conditions adverse to quality are promptly identified and corrected.

e. The causes of significant conditions adverse to quality are determined and corrected to preclude repetition.

f. The condition adverse to quality, the cause and the corrective action are documented and reported to appropriate levels of management.

2. Method of Accomplishment

The preceding objectives were accomplished by:

a. Review of the QA Manual Section 5, paragraph 5.6.3 "Nonconformities and Corrective Action"

b. Observation of the "Receiving Inspection Hold Area," for nuclear rough materials, and the "Nuclear In-process Hold Area" for nonconforming parts.

c. Discussions with cognizant personnel.

d. Review of "Parts Hold Log"; a continuing record for recording all nonconforming nuclear materials and items found at all points in receiving, manufacture, assembly, inspection and test.

e. Review of the following records of an open nonconformance for a 48" NRIA Finished Machined Valve Body for Order D-0066-4:

(1) In-process Inspection Record.

(2) Reject Material Report tag.

(3) Document Transmittal for the rework Nuclear Methods Sheet (traveler).

f. Review of the following completed records of nonconforming items including: description of nonconformance, disposition, action and final resolution:

(1) Receiving Inspection Checklist Record for six (6) Limitorque Valve operators.

(2) In-Process Inspection Records for:

(a) Six Inch Mechanical Valve Disc

(b) Ten Inch Machined Valve Body

(c) Seventy-eight Inch Rough Machined Valve Body

(d) Four Inch Valve Plain Stem

(e) Thirty Inch Valve Banjo Assembly

(f) Ten Inch Premachined Valve Body

(g) Twelve Inch Machined Valve Body

(3) Final Parts Inspection Checklist and Records for:

(a) Two (2) 18" Finished Machined Valve Discs.

(b) Thirty Inch Valve Seat Ring

(c) Two (2) Valve Bottom Covers

g. Review of five (5) Cause and Corrective Action Reports for significant or recurring non-conformities found during a internal system audit.

h. Review of records of monthly reviews of the "Parts Hold Log" for the months of January through June 1980, performed by the Chief Inspector to identify recurring nonconformities.

3. Findings

Within this area of the inspection, no deviations or unresolved items were identified.

F. Internal Audits

1. Objectives

The objectives of this area of the inspection were to verify that the following items were controlled in accordance with applicable NRC and ASME code requirements:

a. A written system has been established to assure that internal audits are performed and controlled in accordance with applicable codes to verify compliance with all aspects of the QA program.

b. Planned and periodic audits are performed in accordance with written procedures or checklists by qualified personnel not having direct responsibilities in the areas being audited.

c. Audit results are documented and reviewed by management having responsibility in the area audited.

d. Followup action, including reaudit of deficient areas, is taken where indicated.

2. Method of Accomplishment

The preceding objectives were accomplished by:

a. Review of the QA Manual Section 5, paragraph 5.6.4 "Internal Quality Assurance Program Audit System".

b. Review of the HPCo schedules of monthly audits for 1979 and 1980.

c. Review of records of the monthly internal audits performed during 1980 and the annual management system audit performed during February, 1980.

d. Review of the completed Cause and Corrective Action Reports generated as a result of deficiencies found during the management audit.

e. Review of HPCo approved procedure QAP-26 "Training and Indoctrination Procedure for Personnel".

f. Review of ANSI Standard N-45.2.23 "Qualification of Quality Assurance Program Audit Personnel for Nuclear Facilities - 1975".

g. Review of the records of the training, qualification and certification of the three (3) auditors who performed the 1980 Management System Audit.

h. Discussions with cognizant personnel.

3. Findings

Within this area of the inspection, no deviations or unresolved items were identified.

G. Manufacturing Process Control

1. Objectives

The objectives of this area of the inspection were to verify that the following items were controlled in accordance with applicable NRC and ASME Code requirements.

a. A written system has been established to assure that manufacturing processes are controlled in accordance with applicable codes.

b. Measures have been established and implemented to control the manufacturing processes by use of process sheets, travelers, checklists or procedures.

c. The process sheets, travelers, checklists or shop procedures used included: the document numbers and revisions to which the processes, inspections or tests conformed; the results of completion of the specific operations; the signature, initials or stamp of the manufacturer's responsible representative and date were shown for operations completed, and the signature, or initials and dates are entered for the activities the Authorized Nuclear Inspector witnessed.

2. Method of Accomplishment

The preceding objectives were accomplished by:

a. Review of the QA Manual Section 9, paragraph 9.6.1 "Nuclear Methods Sheets" (NMS) and paragraph 9.6.2 "Revisions to Nuclear Methods Sheets".

b. Observations of nuclear valve materials, parts and operations, and review of the accompanying parts NMS and assembly NMS (travelers) for the following work:

(1) Materials in the "Rough Material Release Area-Nuclear."

(2) Machining of a valve body shaft hole.

(3) Rough drilling of valve bodies.

(4) Rough machining of valve bodies.

(5) Hydrostatic Testing of a valve disc.

(6) Final Inspection of a completed valve.

c. Review of two (2) completed NMS revisions.

d. Review of the completed NMS for each of the following valve parts for Order No. D-0116-6 and the completed assembly NMS for

(1) 8" Finished Body

(2) Bottom Cover

(3) Seat Retainer Ring

(4) Finished Shaft

(5) Finished Disc

(6) 8" Premachined Body

(7) Body Seating Surface Weld Assembly

(8) Nuclear Valve Leak-off Connection Weldment

(9) Plain Stem

e. Discussions with cognizant personnel.

3. Findings

Within this area of the inspection, no deviations or unresolved items were identified.

H. Welder Qualifications

1. Objectives

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

a. A written system has been established to assure that the welders are qualified in accordance with the ASME Code prior to performing production welding.

b. That the system has been implemented.

2. Method of Accomplishment

The preceding objectives were accomplished by:

a. Review of the QA Manual Section 11, paragraph 11.6.2 "Welding Procedure and Welder Performance Qualifications" and paragraph 11.6.3 "Welder Performance Continuity."

b. Review of the July, 1980 list of "Current Qualified Procedures and Welder List."

c. Review of current performance continuity records, maintained by the Welding Foreman, for approximately 20 welders.

d. Review of 37 records of current welder's performance qualifications for the welding processes of Flux Cored Arc Welding, Shielded Manual Arc Welding, Gas Tungsten Arc Welding and Submerged Arc Welding.

e. Discussions with cognizant personnel.

3. Findings

Within this area of the inspection, no deviations or unresolved items were identified.

I. Qualification of NDE Personnel

1. Objectives

The objectives of this area of the inspection were to verify that the following items were controlled in accordance with applicable NRC and ASME Code Requirements.

a. A written system has been established to assure that measures to control the qualification of Nondestructive Examination Personnel has been documented.

b. The above system has been implemented such that the subject personnel are properly qualified in accordance with NRC, ASME and the manufacturer's requirements.

2. Method of Accomplishment

The preceding objectives were accomplished by:

a. Review of the QA Manual Section 5, paragraph 5.6.2 "Nondestructive Examination and Qualification of NDE Personnel."

b. Review of the approved HPCo procedure QAP-7 "Non-Destructive Examination - Documentation of Testing and Qualification of Personnel."

c. Review of the records of examination, qualification and certification required by the ASME Code and SNT-TC-1A standards for the following HPCo NDE personnel, and a subcontracted NDE service personnel.

(1) HPCo L-III Examiner for dye penetrant (PT), magnetic partical (MT) and visial testing (VT).

(2) Four (4) L-II HPCo persons for the techniques of PT and VT.

(3) One (1) L-II HPCo person for the technique of VT.

(4) One (1) L-II HPCo person for the techniques of VT, PT and Radiography (RT).

(5) Subcontractor - Conam L-III Examiner for the technique of RT.

d. Discussions with cognizant personnel.

3. Findings

Within this area of the inspection, no deviations or unresolved items were identified.

J. Followup on 10 CFR 50.55(e) Report Concerning Inoperability of a Containment Isolation Valve in Sequoyah Unit 1 Due To The Less Of A Key Which Locks The Valve Stem To The Actuator

1. Introduction

On December 12, 1979, by telephone report, and on January 17, 1980, by written report, the NRC was notified by the Tennessee Valley Authority (TVA) pursuant to 10 CFR 50.55(e), of a construction deficiency involving a containment isolation valve in Sequoyah Unit 1, which became inoperable when the key which locks the actuator to the valve shaft fell out of place. This problem could occur with G. H. Bettis Robot Arm valve actuators when installed upside down or sideways, and it could result in a loss of valve control. TVA identified 51 suspect operators in three (3) safety-related systems. The operators that are installed so that the key can work loose will have spacer bushings installed in the actuator as recommended by the vendor. All TVA design project managers were ask to ensure that this problem does not occur at other TVA nuclear plants.

As a result of the TVA report a followup inspection of the subject problem was performed at the Henry Pratt Company in Aurora, Illinois, the company furnishing the locking keys and valves.

2. Objectives

The objectives of this area of the inspection were to ascertain that HPCo had.

a. Performed an evaluation of the condition which caused the loosing of the keys which lock the valve shaft to the actuator

on the Sequoyah Units 1 and 2, including making an assessment of generic considerations relative to other nuclear power plants units.

b. Assigned responsibility and implemented a plan of corrective action.

c. Initiated preventive action within their QA Program.

3. Method of Accomplishment

The preceding objectives were accomplished by:

a. Discussions with cognizant HPCo personnel

b. Observation of a valve to actuator key slotted drive sleeve similar to the subject equipment.

c. Review of the NRC Daily Report dated December 12, 1979, and the TVA final 10 CFR 50.55(e) construction deficiency report dated January 17, 1980, which were used to report the deficiency to the NRC.

d. Review of HPCo's letter dated February 1, 1980, to TVA in which HPCo recommended the use of a bushing for key retention.

e. Review of HPCo letter dated February 28, 1980, to TVA regarding the acceptability of replacing existing valve to operator keys with equivalent keys of longer length.

f. Review of USNRC OIE Circular No. 80-12 issued on May 14, 1980.

g. Review of HPCo letter dated May 1, 1980 to Roy Woods, USNRC, OIE regarding Sequoyah Nuclear Plant Units 1 and 2, 10 CFR 50.55(e) report by TVA, with a copy of a HPCo corrective action recommendation letter concerning the subject potential problem, circulated to each affected nuclear power plant.

4. Findings

a. Within this area of the inspection, no deviations or unresolved items were identified.

b. Other Findings - Comments

Review and discussions with HPCo personnel of the conditions associated with the loose locking key provided the following information:

(1) The Sequoyah Unit 1 valve incident was a first time experience of this specific problem by HPCo.

(2) The locking key is normally a press-fit in the keyways and is normally sealed with Loctite brand adhesive.

(3) HPCo indicated that the specific reason for the loosening of the key had not been established.

(4) HPCo indicated that they had discussed the problem with TVA and then with the NRC OIE Headquarters. The NRC OIE Circular No. 80-12 was subsequently issued on May 14, 1980.

(5) HPCo indicated that TVA advised them that the NRC had been notified of the subject construction deficiency and for this reason, they did not issue a Part 21 notification and report to the NRC OIE.

(6) HPCo's corrective action for Sequoyah appears appropriate. Their assessment of generic considerations included all of the known nuclear power plant units which might have the subject problem, and was accomplished by sending each affected nuclear power plant a typical letter describing the problem; requesting inspection of affected valve shaft keys and recommended field modifications to prevent loosening of keys.

K. Exit Interview

1. The inspector met with the persons denoted in paragraph A, at the conclusion of the inspection on August 1, 1980.

2. The following subjects were discussed.

   a. Areas inspected.

   b. Status of the corrective action for the previous unresolved item.

   c. Inspection findings in this report.

3. Management's questions related to clarification of the above discussions.