

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

Report No. 99900259/80-01

Program No. 51300

Company: Combustion Engineering, Incorporated
C-E Avery Division
Old Dover Road, Post Office Box 630
Newington, New Hampshire 03801

Inspection Conducted: May 19-23, 1980

Inspectors:

L. E. Ellershaw
L. E. Ellershaw, Contractor Inspector
Components Section II
Vendor Inspection Branch

6-05-80
Date

I. Barnes
I. Barnes, Contractor Inspector
Components Section II
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Approved by:

U. Potapovs
U. Potapovs, Acting Chief
Components Section II
Vendor Inspection Branch

6-05-80
Date

Summary

Inspection on May 19-23, 1980 (99900259/80-01)

Areas Inspected: Implementation of 10 CFR 50 Appendix B Criteria, and applicable codes and standards, including: action on previous inspection findings; joint fitup and welding; material identification and control; special welding applications, and manufacturing process control. The inspection involved 60 inspector hours on site by 2 NRC inspectors.

Results: In the 5 areas inspected, 5 deviations from commitment were identified. No unresolved items were identified.

Deviations: Joint Fitup And Welding -- Use of a non-specified Detailed Welding Procedure (DWP) and performance of production welding using amperage and voltage values above the allowed DWP ranges are not in accordance with Criterion V of 10 CFR 50, Appendix B, and Section 14 of the QA Manual (Notice of Deviation, Item A.). Incorrect voltage verification technique in welding

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surveillance activities is not in accordance with Criterion V of 10 CFR 50, Appendix B, Section 14 of the QA Manual and Procedure No. QA-I 1022 Revision 01 (Notice of Deviation, Item B.).

Manufacturing Process Control -- Performance of base metal weld repairs without being referenced in the Manufacturing Process Sheets (MPS) and changes to MPS methods and operations without documentation and authorization, are not in accordance with Criterion V of 10 CFR 50 Appendix B, and Section 13 of the QA Manual (Notice of Deviation, Item C.).

Special Welding Applications -- Use of untested electrodes for a temper bead application is not in accordance with Criterion V of 10 CFR 50, Appendix B, and Section III of the ASME Code (Notice of Deviation, Item D.). Failure to control identity of electrodes used in a temper bead repair weld is not in accordance with Criterion V of 10 CFR 50, Appendix B, and Section III of the ASME Code (Notice of Deviation, Item E.).

DETAILS SECTION I

(Prepared by L. E. Ellershaw)

A. Persons Contacted

D. C. Almeda - Supervisor, Quality Systems
S. Conley - Supervisor, Weld Surveillance
P. E. Gillis - Weld Engineer
R. H. Keyes - Manager, Weld Engineering
W. R. Poteet - Supervisor, Quality Engineering
R. Reilly - Foreman
C. E. White - Manager, Quality Assurance

B. Action on Previous Inspection Findings

1. (Closed) Item A.1. (Report No. 79-02): This item dealt with welders not being equipped to verify compliance with the maximum interpass temperatures as specified by the Detailed Welding Procedures.

C-E Avery has implemented their committed corrective actions in that the fabrication foreman issues Tempil Sticks to the welders when assigning them to welding operations. The inspector observed the issuance and subsequent use of Tempil Sticks by the welders.

2. (Closed) Item A.2 (Report No. 79-02): This item dealt with the use of electrodes in which the resultant welds were subsequently postweld heat treated for times in excess of that which the electrodes were qualified for.

C-E Avery has implemented their committed corrective action in that the electrodes in question were requalified in a postweld heat treated condition for 40 hours. Those heats of electrodes which are not qualified for 40 hours, have been removed from the Welding Material Control List. New purchase orders for this type of electrode now stipulate a postweld heat treat time of 40 hours.

3. (Closed) Item B. (Report No. 79-02): This item dealt with C-E Avery's failure to implement their committed corrective action relative to Detailed Welding Procedures (DWP) not being qualified for the total postweld heat treatment times used in production welding.

C-E Avery has implemented their committed corrective action, in that the inspector verified that all existing DWPs have been reviewed and requalified, where necessary, to reflect the proper postweld heat treatment times. In addition Materials Engineering was assigned the responsibility for review and approval of all future DWPs and their qualifications.

C. Joint Fitup And Welding

1. Objectives

The objectives of this area of the inspection were to verify that C-E Avery had implemented the requirements for the control of joint fitup and welding in accordance with the QA Manual and applicable NRC and ASME Code requirements.

2. Method of Accomplishment

The preceding objectives were accomplished by:

- a. Review of QA Manual Section 14, "Welding," revision 11.
- b. Review of Procedure AM-10-007, "Planning And Control of Welding Functions."
- c. Observation of the following in-process welding operations:
 - (1) Gas Tungsten Arc Welding (GTAW) on Job No. 145-1025-345.
 - (2) GTAW on Job No. 914-064502.
 - (3) Shielded Metal Arc Welding (SMAW) on Job No. 420-100401-30.
 - (4) Gas Metal Arc Welding (GMAW) on Job No. 229-0121
- d. Review of the Detailed Welding Procedures (DWP) associated with the above in-process welding operations.
- e. Discussions with cognizant personnel.
- f. Review of the associated Welding and Examination Instruction Sheets (WEIS).
- g. Review of recently completed welding documentation.

3. Findings

a. Deviation From Commitment

- (1) See Notice of Deviation, Items A.1, A.2 and A.3
- (2) See Notice of Deviation, Item B.

During the inspector's observation of in-process GTAW welding on Job No. 145-1025-345, a review of the DWP showed the voltage

range requirement of 9-17 volts. The voltmeter on the power source showed 22 volts. The Quality Assurance inspector, during the performance of welding surveillance, used a portable Ohm meter/voltmeter to verify the actual voltage being used. The instrument was attached to terminals on the power source. The readings were identical. As a result, a Discrepancy Report (DR) was generated, addressing the use of a voltage higher than that allowed by the DWP. The DR was later considered to be not valid in that the readings were taken at the power source rather than at the torch. A subsequent check of the voltage at the torch, revealed a developed arc voltage of 13 volts, which was within the DWP voltage range.

Concern was expressed relative to the adequacy of the welding surveillance program in-so-far as the amount and type of training received by the QA inspectors.

D. Material Identification and Control

1. Objectives

The objectives of this area of the inspection were to verify that C-E Avery had implemented the requirements for the identification and control of material in accordance with the QA Manual and applicable NRC and ASME Code requirements.

2. Method of Accomplishment

The preceding objectives were accomplished by:

- a. Review of QA Manual Section 12, "Identification And Control Of Material And Items," revision 11.
- b. Review of Procedure AM-10-001, "Welding Materials Control," revision 3.
- c. Observation of material/component identification and a subsequent review of certified material test reports.
- d. Observation of weld material storage.
- e. Discussion with cognizant personnel.

3. Findings

a. Deviation From Commitment

None

b. Unresolved Items

None

E. Exit Interview

A meeting was held at the conclusion of this inspection on May 23, 1980, with the following management representatives and the Authorized Nuclear Inspector (ANI):

R. P. Adams - Manager, Manufacturing
G. E. Allen - Manager, Functional Engineering
D. C. Almeda - Supervisor, Quality Systems
S. Avery - Manager, Commercial Department
M. J. Gauntlett - Production Superintendent
N. C. Irvine - Supervisor, Quality Inspection
R. H. Keyes - Supervisor, Weld Engineering
L. R. Lansford - Manager, Operations Planning & Control
R. J. Maynard - ANI, Hartford Steam Boiler Inspection and Insurance Company
W. R. Poteet - Supervisor, Quality Engineering
C. White - Manager, Quality Assurance

The scope and findings of this inspection were summarized. Management acknowledged the statements relative to the findings.

DETAILS SECTION II

(Prepared by I. Barnes)

A. Persons Contacted

D. C. Almeda, Supervisor, Quality Systems
P. E. Gillis, Welding Engineer
N. C. Irvine, Supervisor, Quality Inspection
R. H. Keyes, Supervisor, Welding Engineering
W. R. Poteet, Supervisor, Quality Engineering
C. White, Manager, Quality Assurance

B. Manufacturing Process Control1. Objectives

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

- a. A system had been established for the control of manufacturing processes, which was consistent with applicable regulatory and ASME Code requirements.
- b. The system was implemented.

2. Method of Accomplishment

The preceding objectives were accomplished by:

- a. Review of Section 10, Revision 11, of the QA Manual, "Instructions, Procedures And Drawings."
- b. Review of Section 11, Revision 11, of the QA Manual, "Document Control,"
- c. Review of Section 13, Revision 11, of the QA Manual, "Control of Construction Processes Examinations, Tests And Inspections."
- d. Review of Section 14, Revision 11, of the QA Manual, "Welding,"
- e. Review of Procedure No. AM-10-007, Revision 03, "Planning And Control Of Welding Functions."
- f. Examination of material, fabrication and QA Program requirements in the following Combustion Engineering, Inc. design specifications:

- (1) Specification No. SYS 80-PE-601, Revision 03, "Standard Specification For Safety Injection Tanks For System 80 Standard Design."
 - (2) Specification No. SYS 80-RCE-0400, Revision 02, "Design And Manufacturing Specification For Reactor Vessel Core Support And Internal Structures For system 80 Standard Design."
- g. Examination of material, fabrication and QA Program requirements in CE-KSB Pump Co. Specification No. 8000-101-013 Revision 03, "Engineering Specification For Reactor Coolant Pump Casing."
- h. Examination of traveler documentation for Job No. 916, Envelope Nos. 0264 and 1038; Job No. 229, Envelope No. 0121; and Job No. 138, Envelope No. 0154 with respect to:
- (1) Definition and control of sequencing of manufacturing operations to provide for compliance with ASME Code fabrication and examination requirements.
 - (2) Compliance with any designated hold points.
 - (3) Completeness of operation signoff.
 - (4) Evidence of fabrication inspection definition and performance consistent with QA program commitments.
 - (5) Resolution of identified nonconformances in a manner consistent with ASME Code and QA program requirements.
 - (6) Use of appropriately qualified welding personnel.
 - (7) Agreement of traveler documentation with observed component visual status.

3. Findings

a. Deviation from Commitment

Concerning Notice of Deviation, Item C, visual examination of a welded cylinder in temporary storage (Job No. 138, Envelope No. 0154) showed weld repairs had been performed on base metal to correct handling damage. Review of the applicable Manufacturing Process Sheets for the assembly showed no operational sequence had been either preassigned or subsequently entered. In addition, no inspection sequence had been entered to assure compliance with the reporting requirements of NG-4132 in Section III of the ASME Code.

No records were available that would provide for positive identification of welding procedure(s), personnel and materials used to accomplish the observed repairs.

The inspector also observed evidence of temporary attachment welds that had been made subsequent to performance of the cylinder longitudinal seam welds, i.e. the attachment welds crossed the top of the completed longitudinal seams. The longitudinal seams were the last signed manufacturing sequence in the Manufacturing Process Sheets (MPS). Review of the Detailed Welding Procedures for the assembly showed that temporary attachment welds had been made subsequent to completion of the longitudinal seams, utilizing a non-welding sequence, i.e. preparation of the longitudinal seams for nondestructive examination. The inspector was verbally informed that the welds had been made to incorporate a strut used in cylinder rounding operations. Rounding operations were not required by the MPS until a later fabrication sequence and using a different apparent methodology. No entries had been made to the MPS on authorizations given, that would permit the observed changes in sequences and methods.

b. Unresolved Items

None

C. Special Welding Applications

1. Objective

The objective of this area of the inspection was to determine if special welding applications such as hardfacing, cladding and repairs performed after final postweld heat treatment conformed to the requirements of the C-E Avery QA program and the additional requirements established by ASME Code Sections III and IX.

2. Method of Accomplishment

The preceding objective was accomplished by:

- a. Review of Section 13, Revision 11, of the QA Manual, "Control Of Construction Processes Examinations, Tests And Inspections,"
- b. Review of Section 14, Revision 11, of the QA Manual, "Welding,"
- c. Review of Procedure No. AM-10-007, Revision 03, "Planning And Control of Welding Functions."

- d. Observation of shielded metal arc, submerged arc and gas metal arc cladding operations with respect to compliance with Detailed Welding Procedure requirements.
- e. Verification of appropriate qualifications for personnel observed performed cladding operations.
- f. Examination of Detailed Welding Procedures applicable to the operations described in d. above and the supporting procedure qualification records, to verify compliance with the requirements of Section IX of the ASME Code.
- g. Review of manufacturing records applicable to hardfacing and temper bead repairs.
- h. Verification of qualifications of welding procedures and personnel with respect to requirements of Section III and Section IX of the ASME Code.

3. Findings

a. Deviations from Commitment

- (1) See Notice of Deviation, Items D and E.
- (2) Concerning Item E elimination of liquid penetrant indications in cladding on a reactor coolant pump casing (Job No. 158, Envelope No. 136090, Serial No. 9) after performance of final postweld heat treatment, resulted in exposure of base material in two (2) areas, i.e. Areas 4 and 10. Repairs were accomplished by the temper bead technique using Detailed Welding Procedure (DWP) RP-10-2 Revision 00 to replace removed ferritic base material and DWP WMC-10-11 Revision 01 to restore cladding.

Examination of the assembly DWPs, which are used at C-E Avery to record the identity of welding personnel and materials used for an operation, showed records only of issue of E 8018 electrodes for the first ferritic layer and E Ni Cr Fe-3 electrodes for the balance of cladding. No DWPs were on file, which would provide for tracing of identity of the electrodes used to perform the balance of the ferritic weld and the initial Inconel cladding layer.

b. Unresolved Items

None.