U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 50-277/84-36

Docket No. 50-277

License No. DPR-44 Priority -- Category C

Licensee: Philadelphia Electric Company

2301 Market Street

Philadelphia, Pennsylvania 19101

Facility Name: Peach Bottom Atomic Power Station, Unit 2

Inspection At: Delta, Pennsylvania

Inspection Conducted: November 5-9, 1984

Inspectors: Lewis Narrow/for 12/5/84
S. D. Reynolds, Jr. date
Lead Reactor Engineer

Approved by: Lewis Narrow/for 12/5/84
J. P. Durr, Chief date
Materials and Processes Section,
EPB, DETP

Inspection Summary:

Inspection on November 5-9, 1984 (Report Number 50-277/84-36)

Areas Inspected: Routine unannounced inspection of the licensee program for recirculating and RHR pipe replacement; and recirculation safe end repair and replacement. The inspection involved 37 hours on site and 8 hours in the regional office by one region-based inspector.

Results: No violations were identified.

DETAILS

1.0 Persons Contacted

Philadelphia Electric Company (PECO)

*R. Fleischmann, Station Superintendent
J. Mulgrew, QA Engineer (E&R Division)
K. Husar, Mechanical Engineer (E&R Division)
M. Fachada, Mechanical Engineer (E&R Division)
W. Smith, QA Engineer (E&R Division)
T. Sisson, ISI Engineer (E&R Division)
R. Jones, Engineer, QC (Construction Division)
E. Edwards, QC Inspector (Construction Division)
J. Cook, QC Inspector (Construction Division)
J. Pizzola, Engineering and Research QA
F. Hoelzle, Construction Engineer (Construction Department)
J. Stanley, ISI Engineer (E&R Division)

Tri-Tools Inc

L. Capps, Technical Specialist

Hartford Steam Boiler Inspection and Insurance Co. (Hartford)

T. Jackson, Authorized Nuclear Inspector

General Electric Corp., A&ES Division (GE)

S. Keppler, Project Installation Manager
K. Noonan, Project Coordinator
D. DiFillipo, QC Manager
W. Anderson, QC Inspector, Level III PT & UT

Chicago Bridge and Iron (CB&I)

K. Schoenleber, Site Manager
C. Halfast, Project Manager
K. Czadnik, QA Manager
B. Ebersole, QA Technician
W. Nevers, Welder
R. Shedd, Welder

Nuclear Regulatory Commission (NRC)

*J. H. Williams, Resident Inspector

*denotes those personnel who attended the exit interview on November 9, 1984

2.0 Background

The purpose of this inspection was to follow-up inspections 50-277/84-13 and 50-277/84-21 and determine current status and acceptability of the licensee's actions in piping and safe end replacement which was degraded by intergranular stress corrosion cracking (IGSCC).

3.0 Licensee Action on Previous Inspection Findings

(Closed) Unresolved Item (50-277/80-25-01): This item concerned the use of a penetrant inspection (PT) examiner whose physical examination records (in his personnel file) indicated color recognition deficiencies. The inspector reviewed licensee correspondence and documents on this subject including: MacFarland (PECO) to Badiali (ETI) dated 7/26/80; Dr. J. Lebovic, O.D., Visual Examination Report dated 7/28/80, Soni (ETI) Level III Examiners memo dated 7/28/80; Soni (ETI) letter to MacFarland (PECO) dated 7/30/80, MacFarland (PECO) to Soni (ETI) letter dated 8/13/80. Review of these documents verified that the subject inspector was capable of interpreting the color contrasts in PT examination. The inspector had no further questions.

4.0 Replacement Piping

The inspector visually inspected Sumitomo induction hot bent spool pieces YYD 9580-1 and YYD 9581-1. The cleanliness, surface finish, and geometric contour of the bend areas were judged to be excellent. Review of the material certifications from Sumitomo indicated the material to have excellent chemistry control, microstructure to be essentially free of inclusions and the heat treatment showed grain boundaries free of carbides. The required NDE was performed and witnessed by Japan Inspection Company (JIC) for GE. The records appeared complete and had been reviewed by licensee engineering and receipt inspection QC personnel.

No violations were identified.

5.0 Residual Heat Removal Head Spray Piping

The piping replacement includes the residual heat removal (RHR) head spray stainless steel piping represented on CB&I drawing 92. Welding in this line is complete. Welds 402, 403, 404 and 405 were made in the CB&I shop with the machine gas tungsten arc welding (GTAW-ME) process and met radiographic requirements.

The inspector questioned the ISI inspectability of the P1 to P8 flange to pipe joint configuration (e.g., 401E which joins 2-10-29A1 to 2-10-29A2) for the RHR head spray piping. This joint utilizes an A8 E309L butter on the flange side of the joint to permit a stainless steel to stainless steel root weld. The thickness of the joint geometry on the flange does not require post weld heat treatment, therefore the buttering is only for improved root weldability. The cognizant licensee ISI engineer indicated

that the dimensions of the flange neck prohibit UT inspection from the flange side, and that the joint will receive a 0° UT on the weld and angle beam inspection from the pipe side. Because of the accessibility to the root, the joint will be penetrant tested if required to verify root conditions. The ISI engineer stated that the buttering will not interfere with adequate interpretation of ISI inspections.

The CB&I weld records for the head spray line were incomplete in that the licensee had not reviewed and approved the radiographic results. The inspector reviewed the completed CB&I activities in the travelers and NDE documents for the RHR head spray line and found them to be acceptable.

No violations were identified.

6.0 CB&I Welding Performance Qualifications

The inspector reviewed the GTAW-ME performance qualification records and also reviewed a sample of the CB&I manual welder performance qualification results. Performance qualification is conducted in accordance with SI #14. Some of the significant features of SI #14 are as follows:

- Paragraph 1.2 permits transfer of CB&I qualifications under the CB&I QA program.
- Paragraph 3.2 requires a copy of the WPS/GWPS to be available to the welder.
- Paragraph 4.1.2 prohibits in process repair of defects.
- The SI document specifies the positions required.
- The SI document indicates that the QA Welding Supervisor is responsible for all performance qualification activities including interpretation of the results.
- The CB&I system does not require completion of a disposition form for RT nor does it require maintenance of the RT film. The film is sent to CB&I in New Castle, Delaware, where it is reviewed by surveillance methods to ensure that the film quality and interpretation are correct. This is done by the Assistant Welding and QA Manager. There is no explicit procedure in the QA program for this operation other than the broad responsibilities in the CB&I QAM Div. 4.

The inspector reviewed SI #8, "Mock-up Demonstration and Training for Welding Equipment Setup and Welding Procedure Implementation Using Video Welding Equipment." (Paragraph 9.0 of this document permits 2 welding operators to be qualified on one test assembly. This system was not followed at the site.) The inspector also reviewed records of GTAW-ME

mock-up training which called for 2 complete test assemblies (2G & 5G) with RT acceptance. The records identify equipment used and filler metal size. More than 25 welding operators have been qualified.

The CB&I machine welding operator and manual welder performance qualifications met ASME SCIX requirements. The GTAW-ME welding operator training and qualification program was very thorough. The intent of IE Information Notice 83-61 for mitigation of potential use of stand-ins for welder qualification tests was met by the system utilized.

No violations were identified.

7.0 CB&I Pipe Fitter Training

The inspector observed a CB&I pipe fitter training program where the CB&I personnel were being instructed in the procedure for setting up a portable weld joint preparation machine tool. The instructor conducting the training was a technical specialist from Tri-Tool Inc.

No violations were identified.

8.0 Observation of Welding

The inspector observed remote GTAW-ME welding operations being conducted by GE on safe ends and by CB&I on the recirculation system. GE is using Arc Machines orbital GTAW-ME equipment and video fiber optics equipment. CB&I is using similar equipment manufactured by Dimetrics. In both cases, the welding was being controlled remotely by adjustments to the parameters determined by visual (TV) observation of the molten pool and solidified metal directly behind the molten pool through a fiber optics TV system. Both welding organizations had an optional "hands on" observer describing welding bead characteristics and reporting by phone to the welding operator. The observers are also qualified welding operators. The inspector observed the availability and use of supplementary welding data in the form of pendant setting forms which provide more explicit "directions to the welding operator" than is available in the Welding Procedure Specification (WPS) documents for both GE and CB&I welding operations. The welding observed represented root pass consumable insert fusion, hot passes on top of the root pass and in-process joint welding. CB&I welding in pass #25 of weld joint 041 was observed. GE root welding on 330° safe end nozzle was observed.

Radiography of CB&I completed GTAW-ME welded joints on the RHR head spray line indicated that these welds met the volumetric soundness requirements with no repair required. The machine welding to date appears to be successful either in the "hands on" mode or "remote TV operation" mode.

No violations were identified.

9.0 GE Safe End Activities

At the time of inspection, the licensee had determined that only two recirculation inlet safe ends require replacement. During the course of the inspection, the CB&I repair activities on the other eight safe ends were halted because the licensee was reevaluating the repair of safe ends and will probably replace all of the safe ends. The replacement operation is in accordance with GE 23A153, Revision 2, which references SCIII, SCIX and SCXI 1980 Winter 81. The procedure calls for etching to determine the centerline of the original P8 to P3 weld joint and machining to remove the safe end without removal of the buttering on the nozzle side of the joint. Traveler SER-T-270 is written for safe end removal and SEI-T-270 for installation of the new "tuning fork" safe end and thermal sleeve.

A mock-up was utilized for training and requalification purposes.

A total of 10 welding operators have been qualified for TV optics machine GTAW to GE WPC 8.8.6. For this activity GE interprets that the A8 buttering material on the nozzle results in a P8 to P8 weldment for qualification purposes. The GE welding operators were all previously qualified under the GE QA program at Pilgrim with Dimetrics equipment and TV optics for P43 to P43 butt joints or at Oyster Creek with Arc Machines equipment with TV optics on IGSCC weld repair overlays on butt welds on P8 materials.

The six Oyster Creek welding operators were requalified in pairs welding 10" x .365" wall P1 pipe with A8 filler metal using the Arc Machines equipment with TV optics at the GE Levittown Weld Shop facility under the GE QA program. These three test assemblies were accepted by radiographic examination.

The four Pilgrim welding operators were given familiarization training with the Arc Machines equipment and welded small portions of a test assembly on the mock-up.

The inspector met with the cognizant licensee Engineering and Research QA Engineer and discussed the adequacy of the welding operator performance qualification testing for the GE safe end operations. The licensee stated the following: "All welding operators have prior experience and SCIX qualification with orbiting machine welding devices. All welding operators performed welding operations with the device being used for the safe end welding under the GE QA program. Their prior qualifications have been reviewed, are acceptable and do not require renewal. Their prior qualifications are acceptable to SCIX and PECO requirements. All welding operators participated in the welding of the safe end mock-up with the Arc Machines device." Tack welders are qualified to GE WPC 8.8.4.

The inspector concurred that the GE welding operators were qualified in accordance with current SCIX QW 305 requirements.

The inspector observed welding in process on the 330° nozzle for the consumable insert fusion and subsequent hot passes on the safe end. Upon completion of this operation, supplemental RT and PT indicated satisfactory quality. The next sequential operation is the welding of the thermal sleeve to the "tuning fork" protuberance using a consumable insert root. When the thermal sleeve weld is completed and penetrant tested, the remainder of the safe end weld is completed.

The inspector reviewed the GE traveler system for the safe end replacement.

No violations were identified.

10.0 Quality Assurance

The inspector reviewed the activities of the licensee in conducting quality assurance audit activities related to the recirculation piping replacement. Included were the following:

Audit Report (OP-290-)	Audit Date or Period	Subject
OP-290	5/17-9/19/84	N45.2.6 Qualification (CB&I procedure and 37 personnel)
-1A	6/29/84	Bechtel On-Site Engineers (IE Circular 80-22)
-1B	8/15/84	GE On-Site Engineers (IE Circular 80-22)
-1C	8/21/84	SWEC On-Site Engineers (IE Circular 80-22)
-2C	9/12-10/11/84	Head spray and RHR piping documentation packages (Finding report written on UT of circumferential weld examination and thickness measurements)
-04	9/13/84	Finding report on GE purchase order deficiencies in stating personnel qualification to ANSI N45.2.6

Audit Report (OP-290-)	Audit Date or Period	Subject
-05	9/18/84	Finding report on inclusion of GE Technical Services Company and Japan Inspection Company on GE approved vendor list
-6A	10/5/84	Qualification of CB&I QA program for piping replacement
-10	9/25/84	Finding report on lack of complete thickness measurements on spool piece 2-10-29A-3
-11 -12	10/17/84	Finding report on lack of PECO identification of safe ends machined and supplied by GE, and handling and storage deficiencies

The inspector also reviewed the licensee "stop work" directive to CB&I based on lack of implementation of IE Information Notice 83-61 and the CB&I special instruction SI20 which adequately addresses this subject. The implementation of SI20 was also verified by the inspector during the course of reviewing welder performance qualification documentation.

The licensee audits were thorough and showed good QA overview of the pipe replacement activity.

No violations were identified.

11.0 Exit Interview

The inspector met with the licensee representative (Plant Superintendent) and the NRC Resident Inspector at the conclusion of the inspection on November 9, 1984. The inspection summarized the scope and findings of the inspection. No written information was given to the licensee by the inspector during the course of the inspection.