



UNITED STATES
 NUCLEAR REGULATORY COMMISSION
 REGION II
 101 MARIETTA STREET, N.W.
 ATLANTA, GEORGIA 30323

Report Nos.: 50-321/84-49 and 50-366/84-49

Licensee: Georgia Power Company
 P. O. Box 4545
 Atlanta, GA 30302

Docket Nos.: 50-321 and 50-366

License Nos.: DPR-57 and NPF-5

Facility Name: Hatch 1 and 2

Inspection Conducted: December 3-6, 1984

Inspector: *J. J. Blake* 1/7/85
 for B. R. Crowley Date Signed

Approved by: *J. J. Blake* 1/7/85
 J. J. Blake, Section Chief Date Signed
 Engineering Branch
 Division of Reactor Safety

SUMMARY

Scope: This routine, unannounced inspection entailed 30 inspector-hours on site in the areas of overlay welding (Unit 1), licensee action on previous enforcement matters (Unit 1), and inspector followup items (Units 1 and 2).

Results: One violation was identified - failure to follow weld material control procedure.

REPORT DETAILS

1. Licensee Employees Contacted

- *H. Nix, Site General Manager
- D. McCusker, Superintendent of QC
- *J. Wilkes, Special Projects Manager
- *W. Drinkard, Project Manager - RECIRC Pipe Project
- *H. Talton, Deputy Project Manager - RECIRC Pipe Project
- J. Edwards, Senior Regulatory Specialist
- *T. Elton, Acting Superintendent of Regulatory Compliance
- P. Norris, Senior Plant Engineer
- *R. Godby, Plant Engineer
- *D. Vaughn, Senior QA Field Representative

Other Organizations

- *D. Barnes, ISI Site Coordinator, Southern Company Services (SCS)
- J. Agold, Supervisor of Coordination and Documentation, SCS
- M. Belford, ISI Lead Engineer, SCS
- G. Loftus, NDE Inspector - LIII, SCS
- L. Finney, Welding Engineer, NUTECH

NRC Resident Inspector

- *P. Holmes-Ray, Resident Inspector

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on December 6, 1984, with those persons indicated in paragraph 1 above. The licensee acknowledged the inspection findings listed below and took no exceptions.

(Open) Inspector Followup Item 321/84-49-01, Clarification of Weld Material Control Procedure - Paragraph 6.a.(2)(a).

(Open) Violation 321/84-49-02, Failure to Follow Weld Material Control Procedure - Paragraph 6.a.(2)(b).

(Open) Inspector Followup Item 321/84-49-03, Clarification of Requirements for Overlay Weld Taper - Paragraph 6.e.

3. Licensee Action on Previous Enforcement Matters

(Closed) Violation 321/84-03-01, Failure to Follow Procedure for Recording Location and Extent of ISI NDE Examination of Reactor Vessel Weld. See RII Report No. 50-321/84-11 for a previous inspection of this item. At the time

of the previous inspection, it could not be determined whether correlating information was available to substantiate performance of the required inspection on the vessel to flange weld or whether the area in question would be reinspected. During the current outages, it was determined that correlating information was not available to substantiate performance of the required inspection. Therefore, the weld was reinspected from 116° (230") to 360° (710") covering the required area for both the second and third 40-month periods. The inspector reviewed the records for this inspection.

4. Unresolved Items

Unresolved items were not identified during this inspection.

5. Independent Inspection Effort (92706B)(Unit 1)

At the time of this inspection, the licensee had completed the inspection of 100% of the large diameter stainless steel welds in the recirculation (RECIRC), residual heat removal (RHR), and reactor water cleanup (RWCU) systems in response to Generic Letter 84-11. Overlay welding was in process on a number of welds. See RII Reports 50-321/84-42, 50-321/84-43, and 50-321/84-44 for details of previous inspections in this area. The following summarizes the inspector's reviews/observations made during the current repair activities:

a. Based on inspection results, 21 welds contained indications that required either overlay repair welding or analysis. The following summarizes the disposition of the 21 welds:

- 12-12" RECIRC Riser Welds: Overlay repair welding being performed
- 1-24" RHR Weld: Overlay repair welding being performed
- 4-28" RECIRC Welds: Overlay repair welding being performed
- 2-22" RECIRC Saddle Welds: Accepted for another cycle by analysis
- 2-28" RECIRC Welds: Accepted for another cycle by analysis

At the conclusion of the inspection, three welds, two 28" and one 12", were still in process.

b. During overlay welding, the following problems occurred:

- Welding blowout occurred in two 12" welds indicating thru wall cracks. These were welds 12AR-K-3 and 12BR-C-2. At the conclusion of the inspection, weld 12AR-K-3 had been repaired and the overlay completed. Weld 12BR-C-2 had been repaired and the weld

overlay was in process. The repairs were made by grinding into the base material 3/16" and repairing manually prior to completing the overlay.

- For weld 28-A-10, there was a mixup of filler material and two and one half passes of inconel were inadvertently used. At the conclusion of the inspection, the inconel had been ground out. The excavated area was waiting acid etching to verify complete removal of the inconel. See paragraph 6.a.(2)(b) below for additional details.

- c. See paragraphs 6, 7, 8 and 9 below for additional reviews and examinations made by the inspector.

In this area of inspection, no violations or deviations were identified.

6. Nuclear Welding (Welding Overlay) (50050) (Unit 1)

The inspector examined the licensee's program for ASME Code welding relative to welding overlay to determine whether applicable Code and regulatory requirements were being met. NUTECH is the contractor for the repair work and is working under the Georgia Power QA program using Georgia Power's procedures. Welders are being qualified by Georgia Power Company. In accordance with the NUTECH ASME Section XI Repair Program, the applicable Code is the ASME Boiler and Pressure Vessel Code, Section XI, 1980 Edition with addenda through W80. Welders and procedures are qualified to ASME Boiler and Pressure Vessel Code, Section IX, 1983 Edition with Addenda through W83.

a. Welding Material Control

The applicable procedure for weld material control is HNP-6916, Revision 15, Control of Welding Materials.

- (1) The inspector performed the following verifications related to control and handling of welding materials:

- (a) That material purchasing and receiving operations were conducted in accordance with approved procedures.

The inspector reviewed the purchasing and receiving records for .035", ER308L, Ht. No. S57735, P. O. No. PEHA-00950, which was being used for the in process overlay welds listed in paragraph d. below.

- (b) That environmental controls for electrodes were in accordance with applicable procedures.
- (c) That the licensee's system for welding material control met the most restrictive application and the personnel involved were knowledgeable of the system.

- (d) That welding materials were clearly identified at all times and that identification was retained throughout storage and handling and until consumed.
- (e) That method of disbursement was in accordance with applicable procedures.
- (f) That ASME Code required tests were performed on each heat of material.

The inspector reviewed the certified Material Test Report for the heat of material listed above.

- (2) During the above reviews/examinations and the observations noted in paragraph d. below, the inspector noted the following problems.

- (a) The inspector noted that paragraph E. of procedure HNP-6916 did not clearly cover tool room storage of coated electrodes other than low hydrogen. In addition, paragraph G. of the procedure is not clear relative to issue of bare wire on spools. The licensee agreed to clarify procedure HNP-6916 relative to these two areas. Pending review of the revised procedure, this matter is identified as Inspector Followup Item 321/84-49-01, Clarification of Weld Material Control Procedure.
- (b) During the entrance interview, the licensee informed the inspector that during overlay of one of the RECIRC System welds, a welding material mixup had occurred and inconel material had been inadvertently used on a stainless steel overlay. Review of this problem and discussions with the licensee revealed the following:

- The weld material mixup occurred on 11/30/84 during overlay welding of 28" RECIRC Weld 28-A-10. After changing to a new spool of wire the welder noticed that something was wrong. After 2½ passes were welded, investigation revealed that the new spool of wire was ERNiCr-3 (inconel) in lieu of the required ER308L (stainless steel). Deficiency Report (DR) 1-84-835 was issued.
- The licensee's investigation of this problem revealed that the weld material mixup occurred because of multiple violations of the weld material control procedure HNP-6916.

Paragraph D.3. of the procedure requires that bare welding wire be stored in the warehouse in a manner to preclude mixing with other materials. Investigation revealed that the inconel was stored with identical

boxes of stainless steel in a bin designated for stainless steel.

Paragraph F.1.a. of the procedure requires that the heat or lot number be entered on the Inventory Material Request when issuing the material from the warehouse. The heat number for the inconel material was entered on the Inventory Material Request for stainless steel and the inconel material issued from the warehouse.

Paragraph E.2 of the procedure requires that material be stored in the Tool Room in a manner to preclude mixing with other material. Investigation revealed that inconel was stored with stainless steel in the Tool Room.

Paragraph G.6. of the procedure requires that the person issuing welding material from the Tool Room record the heat or lot number of the material on the Weld Material Requisition. The inconel heat number was recorded on the Weld Material Requisition for stainless steel and the inconel material issued.

Paragraph G.10. of the procedure requires that the welder verify the type of welding material received. The welder did not verify that the material was stainless steel as entered on the Weld Material Requisition.

- The licensee's investigation revealed, that based on the fact that the inconel spools of wire were packaged in boxes identical to the boxes of stainless steel wire, that welding personnel were under the false impression that only stainless steel material spools were available, and that the inconel was stored in the stainless steel bin with identical stainless steel boxes; no one bothered to verify the type material before issuance and use.

This failure to follow the weld material control procedure is in violation of Technical Specification 6.8.1.a and is identified as Violation 321/84-49-02, Failure to Follow Weld Material Control Procedure.

During the inspection, the licensee decided to grind out the inconel weld material. The inspector observed the cavity after grinding and demonstration of the acid etch technique to be used for assurance of inconel removal.

b. Welding Procedures

The inspector reviewed WPS 35, Revision 2, and supporting PQRs to verify:

- (1) Compliance with applicable procedures for preparation, qualification, approval/certification, distribution, and revision of WPSs.
- (2) That all essential variables, supplementary essential variables, and nonessential variables were defined in accordance with ASME Code requirements.
- (3) That WPS has been qualified and supporting PQRs were on file.
- (4) That PQRs listed the essential variables and that values and ranges of variables were consistent with WPS and Code requirements.
- (5) That all mechanical tests required by Code had been completed and properly documented.
- (6) The PQRs had been properly approved/certified.
- (7) That changes to WPS essential variables were supported by requalification.

c. Welder Performance Qualification

The inspector verified by review of qualification records that 12 welding operators, who were welding on the welds listed in paragraph d. below, were currently qualified to weld under the applicable procedure.

d. Production Welding

The inspector observed the below listed in-process welds at various stages of completion:

28B-11	28B-3	12AR-F-2
28A-10	28B-4	12BR-C2

The welding was observed to determine whether:

- (1) Work was conducted in accordance with a document which coordinates and sequences operations, references procedures, establishes hold points, and provides for production and inspection approval.
- (2) Procedures, drawings, and other instructions were at the work station and readily available.
- (3) WPS assignment was in accordance with applicable Code requirements.

- (4) Welding technique and sequence were specified and adhered to.
- (5) Welding filler materials were the specified type and traceable to certifications.
- (6) Weld joint geometry was in accordance with applicable procedure and was inspected.
- (7) Alignment of parts was as specified.
- (8) Temporary attachments were by qualified welders in accordance with a qualified WPS.
- (9) Preheat and interpass temperatures were in accordance with applicable procedures.
- (10) Welding technique was in accordance with applicable procedures.
- (11) Electrodes were used in positions and with electrical characteristics specified.
- (12) Shielding gas was in accordance with the welding procedure.
- (13) Gas flow meters were correct.
- (14) Welding equipment was in good condition and automatic welding equipment was calibrated.
- (15) Interpass cleaning was in accordance with applicable procedures.
- (16) Temporary attachments were removed in accordance with applicable procedures.
- (17) Gas purging, if specified, was used in accordance with applicable procedure.
- (18) Process control system had provisions for repairs.
- (19) Welders were qualified.
- (20) No peening performed on root and surface layers.

e. Examination of Welds

Selected welds listed below were examined to verify by visual inspection that the following characteristics conformed to ASME Code and applicable procedures.

- (1) Weld surface finish and appearance

- (2) Transition between components of different diameters and thicknesses
- (3) Weld reinforcement
- (4) Removal of temporary attachments, arc strikes and weld spatter
- (5) Finish grinding - absence of wall thinning
- (6) Absence of surface defects

Welds Examined:

12AR-F-3	12AR-J-3
12BR-C-3	12BR-D-3

During examination of the above finished welds, the inspector noted that the taper on the side of the overlay weld 12AR-J-3 appeared excessive (approximately 70-80 degrees) in certain locations. The inspector questioned the licensee relative to the required taper and found that the NUTECH design did not specify a required angle. The design sketch was drawn to an angle that appeared to be about 45°, but no angle was specified. The inspector questioned the lack of specification of an angle since an excessive angle would have an effect on the stress concentration factor. The licensee's consultant (Structural Integrity) was contacted and confirmed that the taper does have some effect on the stress calculations. Structural Integrity indicated that the stress concentration factor is of little importance for the materials (stainless steel) and service (RECIRC system) involved. The licensee agreed to evaluate this question and clarify the taper requirements. Pending review of the clarification, this matter is identified as Inspector Followup Item 321/84-49-03, Clarification of Requirements for Overlay Weld Taper.

In this area of inspection, no violations, except as noted in paragraph a.(2)(b.), or deviations were identified.

7. Visual Examination (Welding Overlay) (57050) (Unit 1)

The inspector examined the visual (VT) examination activities described below relative to welding overlay to determine whether applicable code and regulatory requirements were being met. See paragraph 6 above for the applicable code.

a. Visual inspection records for the below listed welds were reviewed.

12AR-K-2	12BR-E-2
12AR-K-3	12AR-H-3
12AR-H-2	12AR-J-3
12BR-D-3	12BR-C-3
12AR-F-3	12BR-E-3

- b. The following welds were visually examined by the inspector to verify compliance with procedure requirements (see paragraph 6.e. above):

12AR-F-3	12BR-C-3
12AR-J-3	12BR-D-3

- c. The visual inspection qualification records for the examiners who inspected the weld listed in a. above were reviewed.

In this area of inspection, no violations or deviations were identified.

8. Liquid Penetrant Examination (Welding Overlay) (57060) (Unit 1)

The inspector examined the liquid penetrant (PT) activities described below relative to overlay welding to determine whether applicable code and regulatory requirements were being met. See paragraph 6 above for the applicable code.

- a. The inspector observed liquid penetrant (PT) examination of the first layer, after repair, of weld 12BR-C-2 to verify that:
- (1) Applicable instructions or travelers clearly specified the procedure to be used and that a copy of the procedure was available for the inspection.
 - (2) Sequencing of examinations relative to other operations was specified and in accordance with applicable Code and procedures.
 - (3) Personnel performing the examinations were qualified.
 - (4) Materials used for the examinations were certified and the certifications met applicable requirements.
 - (5) Areas, locations and extent of examinations were clearly defined.
 - (6) The following attributes were as specified in the applicable procedure and consistent with applicable code:
 - (a) Surface preparation/cleaning method, type, time, etc.
 - (b) Penetrant type
 - (c) Penetrant application method
 - (d) Penetration time
 - (e) Temperature of surfaces
 - (f) Penetrant Removal
 - (g) Drying
 - (h) Developer, application, type
 - (i) Developing time
 - (j) Evaluation technique
 - (k) Acceptance criteria
 - (l) Reporting of results

- b. Personnel qualification/certification records for NDE personnel who performed the PT inspections of the welds listed in paragraphs a. above and c. below were reviewed.
- c. The inspector reviewed PT inspection records for the welds listed below for compliance with procedure requirements.

12AR-K-2	12BR-E-2
12AR-K-3	12AR-H-3
12AR-H-2	12AR-J-3
12BR-D-3	12BR-C-3
12AR-F-3	12BR-E-3

- d. Certification records for penetrant materials used to PT the welds listed in paragraph c. above were reviewed.

In this area of inspection, no violations or deviations were identified.

9. Ultrasonic Examination (Welding Overlay) (57080) (Unit 1)

The inspector examined the ultrasonic (UT) examination activities described below relative to overlay welding to determine whether applicable code and regulatory requirements were being met. See paragraph 6 above for the applicable code.

- a. SCS procedure UT-H-403, Revision 1, Ultrasonic Examination of Weld Overlay Cladding, was reviewed to determine whether the procedure had been approved and issued in accordance with the QA program. In addition, the procedure was reviewed to determine whether the following parameters were specified and controlled in accordance with applicable requirements:
 - (1) Type of apparatus
 - (2) Extent of coverage including beam angles; scanning surface rate, and direction; and scanning technique
 - (3) Calibration requirements
 - (4) Sizes and frequencies of search units
 - (5) DAC curves
 - (6) Reference level of monitoring discontinuities
 - (7) Methods for demonstrating penetration
 - (8) Levels for evaluation and recording indications
 - (9) Method of recording and reporting significant indications

(10) Acceptance Criteria

- b. At the time of the inspection, no UT examinations were in process. Since the inspector was concerned about the quality of examinations (see Inspector Followup Item 321/84-42-01, paragraph 10.a below), the licensee was requested to demonstrate the UT technique being used for the overlays. The following summarizes the techniques being used and the inspector's observations:
- (1) Calibration was demonstrated on the calibration block using the following transducers and calibration holes:
 - (a) Straight beam - 3/8" dual, 2½ MHz, .375" and .125" flat bottom holes
 - (b) Angle beam - 3/8" x 3/8" dual, 2½ MHz, 70° refracted longitudinal on .0625" side drilled hole at the overlay to base metal interface
 - (2) Only the overlay weld was inspected. The base material under the overlay was not inspected.
 - (3) The above two UT techniques were demonstrated on overlay weld 12AR-J-3. The inspector noted that at scanning sensitivity (+6db minimum) the noise level was 25% to 35% of full screen. However, on the calibration block and the weld, when scanning at reference level to +3db, the noise level was only 15% to 20% of full screen. The procedure allowed for scanning at the lower level if the noise level was a problem and the examiner indicated that the lower scanning level was desirable to reduce the noise level.
- c. Personnel qualification/certification for NDE personnel who performed the UT inspections of the welds listed in paragraphs b. above and d. below were reviewed.
- d. The inspector reviewed UT inspection records for the welds listed below for compliance with procedure requirements.

12AR-K-2	12BR-E-2
24A-R-13	12AR-H-2

In this area of inspection, no violations or deviations were identified.

10. Inspector Followup Items (92701) (Units 1 and 2)

- a. (Closed) Inspector Followup Item 321/84-42-01, Ultrasonic Inspection Technique for Inspection of Weld Overlays. During a previous inspection (84-42) while observing UT inspection of overlay welds made during the 1982 outage, the inspector questioned the UT technique due to

excessive noise on the UT screen. The same technique was being used as that used on the original inspection in 1982. The technique employed used a 1/2" x 1/2", 1½ MHz, 45° shear wave transducer. The inspector recalled that during the Unit 2 overlay inspections, a 3/8"x3/8" dual, 2½ MHz, 70° refracted longitudinal transducer was used which improved the noise problem and produced a better inspection. Since the 84-42 inspection, SCS tried the 70° refracted longitudinal transducer on the calibration block for the 1982 overlays and concluded that there was no significant improvement in noise level over that of 45° shear wave transducer used. During the current inspection, the inspector made the following observations and conclusions.

- (1) During observation of UT of the present overlays (see paragraph 9.b. above), the technique being used was tried on one of the 1982 overlays and the calibration block for the 1982 overlays. There appeared to be a slight improvement in noise level over that of the 45° shear wave transducer, but not that significant.
 - (2) One factor that appeared to cause the noise level to be greater for the 1982 overlays and calibration block was that these overlays were generally thicker than the Unit 2 overlays and the current overlays on Unit 1.
 - (3) Based on the above discussion and observations, the inspector concluded that the inspection performed was consistent with present technology and adequate to detect significant flaws.
- b. (Open) Inspector Followup Item 366/84-23-01, Resolution of Indications in Jet Pump Instrument Nozzle Safe-Ends. The licensee's letter NED-84-401, explaining why indications observed are not defects, has been reviewed. A supplemental letter clarifying the location of the indications on the UT screen is being issued.