UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30303

Report Nos.: 50-321/84-23 and 50-366/84-23

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 Dates: June 18-22, 1984

Inspection at Hatch site near Baxley, Georgia

Inspectors: _____ 7/10/84
for B. R. Crowley Date Signed

_____ 7/10/84
for J. L. Coley Date Signed

Accompanying Personnel: R. W. Newsome
J. H. Smith (Oak Ridge National Laboratory)

Approved by: _____ 7/10/84
J. J. Blake, Section Chief Date Signed
Engineering Branch
Division of Reactor Safety

SUMMARY

Scope: This routine, announced inspection entailed 66 inspector-hours on site in the areas of evaluation of UT indications in feedwater weld 2B21-1FW-12AA-12 (Unit 2); evaluation of UT indications in RECIRC weld 2B31-1RC-12AR-K-5 (Unit 2); induction heat stress improvement (Unit 2); inservice inspection (ISI) (Unit 2); and inspector followup items (Units 1 and 2).

Results: No violations or deviations were identified.

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REPORT DETAILS

1. Persons Contacted

Licensee Employees

*H. Nix, Site General Manager
*P. Fornell, QA Site Manager
*D. McCusker, Superintendent of QC
*W. Drinkard, Field Coordination Supervisor-RECIRC Piping Project
*W. Prescott, Lead QC Inspector-RECIRC Piping Project
*P. Norris, Senior Plant Engineer
*D. Vaughn, Senior QA Field Representative

Other Organizations

J. L. Rath, Project Manager, Newport News Industrial Corporation (NNI)
C. L. Trent, Field QA Supervisor, NNI
*J. Agold, Southern Company Services (SCS), Lead NDE Inspector
*M. Belford, SCS, Lead NDE Engineer
J. Davis, SCS, Level III Examiner
R. Greer, NUTECH Engineers, Inc., Field QA Supervisor
B. Thomas, NUTECH Engineers, Inc., Shift Supervisor

NRC Resident Inspectors

*J. Crelenjak, Senior Resident Engineer
*P. Holmes-Ray, Resident Inspector

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on June 22, 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 366/84-23-01, Resolution of Indications in Jet Pump Instrument Nozzle Safe-ends, paragraph 7.a.

(Open) Unresolved Item* 366/84-23-02, AWS Undercut Requirements, paragraph 8.a.

*Unresolved items are matters about which more information is required to determine whether they are acceptable or may involve violations or deviations.

3. Licensee Action on Previous Enforcement Matters (92702) (Unit 2)

(Closed) Violation 366/84-11-01, Failure to Provide a Procedure for Calibration of Automatic Welding Equipment. Georgia Power Company's letter of response (NED-84-248) dated May 17, 1984, has been reviewed and determined to be acceptable by Region II. Based on examination of corrective actions, as stated in the letter of response, and discussions with responsible licensee personnel, the inspectors concluded that Georgia Power had determined the full extent of the subject violation, performed the necessary survey and followup actions to correct the present conditions, and developed the necessary actions to preclude recurrence of similar circumstances. The inspector reviewed NNI Instruction 1918-K-W005, "Calibration of Diametrics Gold Track II Welding Systems," which was issued to cover welding equipment calibration.

4. Independent Inspection Effort (92706) (Unit 2)

a. Ultrasonic Examination of Feedwater Nozzle 2N4A to Transition Weld 2B21-1FW-12AA-12 Using A Creeping Wave Transducer.

During the current outage, while performing ultrasonic (UT) inspection to satisfy the requirements of NUREG 0619, the licensee's ISI contractor, Southern Company Services (SCS), found a circumferential indication approximately 7" long (approximately 8" to 15" clockwise from top dead center) on nozzle 2N4A at weld 2B21-1FW-12AA-12. On March 23, 1984, a meeting was held with Georgia Power Company (GPC) representatives in the Region II office in which GPC presented their preliminary findings and plans for future investigation and possible repair of the indication. On April 24, 1984, a second meeting was held with Georgia Power Company representatives in the Region II office to discuss GPC's conclusions and proposed plan of action relative to the UT indications. Southern Company Services summarized the NDE evaluations performed as follows:

- UT Exam by LMT/SCS of all feedwater safe-end area welds, nozzle bores, and inner radius areas per NUREG-0619 - Linear indication located approximately 8" to 15" clockwise from top dead center
- GE Manual UT Exam - Confirmation of the indication
- Iridium Radiograph - No crack-like indications
- Boroscope Exam with GE/GPC Personnel (No cleaning) - No detectable indications on the ID of the nozzle or thermal sleeve
- MINAC radiography at three off-set angles - No crack-like indications
- UT Exam by SWRI using same examiner and equipment as used in the 1982 ISI - Essentially the same data as in 1982

- UT Exam by GE using the GEDAS Automated System - Several Linear indications defined in the same area as the linear indication reported by LMT/SCS

The conclusion was reached that the UT indications were the result of fabrication flaws and not service induced based on the following:

- The fabrication radiographs have indications similar in nature and located in the same area as the UT indications. They match up very well for comparing UT and RT.

- The fabrication radiographs for the other quadrants of this weld show no discontinuities, which agrees with the UT.

- There has been no history of cracking in this weld in any GE plant. All other safe-end welds, nozzle bore areas, and nozzle inner radius areas were examined and there were no recordable indications.

- There is no evidence of growth in these indications:

  - The iridium radiography showed no cracking.

  - EPRI felt the MINAC had the sensitivity to detect cracking at those levels reported by UT examination, e.g., 30% thru-wall.

  - The 1982 and 1984 SWRI data is essentially the same.

  - Sizing techniques have been shown to oversize the depth of shallow indications.

  - UT indications are not representative of fatigue cracking.

  - The weld is a relatively low stress area and no growth of the indications would be expected during the plant design life.

Georgia Power Company, however, committed to perform the following:

- Perform a detailed "baseline" examination of the N4A nozzle following flood-up of the reactor pressure vessel after completion of recirculation piping replacement as a reference for future examinations to assure the indication has not increased in size. Per NRC staff request, GPC will notify NRC Region II reasonably in advance when the "baseline" examination will be performed so that NRC inspection personnel may witness the performance of that examination,

- Review preservice inspection data from the mechanized ultrasonic examination of the N4A nozzle to determine the location(s) of the "geometric" indications observed during that examination,

- Review examination data from the last Hatch Unit 1 examination of the feedwater nozzles to see if similar methodology was used as that for Hatch Unit 2 and results thereof, and

- Reinspect the Hatch Unit 2 N4A nozzle during the next two refueling outages. Should the ultrasonic data essentially be the same after the two successive inspections, the examination frequency would revert to every other refueling outage as required by NUREG-0619, "BWR Feedwater Nozzle and Control Rod Drive Return Line Nozzle Cracking."

On June 19, 1984, Region II was notified that GPC would perform the detailed "baseline" examination of the N4A nozzle on June 21, 1984. Inspectors from Region II and a NRC consultant from the Oak Ridge National Laboratory visited the site to observe SCS perform the baseline examination and to take additional data on the indications using advanced UT sizing techniques. However, on June 21, 1984, the SCS Level III Examiner was involved in evaluation of indications in the jet pump instrument nozzle safe-ends and, therefore, the baseline inspection of the feedwater nozzle indications was delayed until a future date. However, the SCS Level III Examiner did go with the NRC inspectors and their consultant to observe the inspectors size the indications. The inspectors examined the indication using a normal 45° shear wave transducer and a creeping wave transducer. The creeping wave transducer is a multiple wave transducer that utilizes a 70° refracted longitudinal wave to detect a crack tip in the upper 1/3 of the base metal. The purpose for using this creeping wave was to help assure that the licensee had reached the correct conclusions during their evaluation, and that the indication was a fabrication related discontinuity and not a very deep crack. The creeping wave transducer should discern this difference. During the examination of the discontinuity, the creeping wave transducer did not give any indication of a deep crack except for one area approximately one inch long at 2:00 o'clock. However, after further evaluation of the indication using both the creeping wave transducer and the normal shear wave 45° transducer, the inspectors concluded that the signals obtained when using the creeping wave were caused by small inclusions in the weld that were magnified by the additional signal gain required in order to perform a creeping wave examination. Small indications could also be seen with the normal shear wave transducer when signal gain was added. (Also, SCS indicated that the radiographic film showed inclusions in this area.) These inclusions apparently were responsible for SCS initially calling the indication 30% throughwall, because the signals would "walk" from the I.D. surface to the inclusions as though they were connected.

b. Ultrasonic Examination of 12" Recirculation System Safe-end Weld for Intergranular Stress Corrosion Cracking (IGSCC) of Inconel Buttering -

The NRC inspectors also examined weld No. 2B31-1RC-12AR-K-5 on the recirculation system to evaluate UT indications found by SCS during ISI. The inspectors concluded that the signals obtained on this weld were interface signals between the steel and the inconel and not IGSCC.

c. Induction Heat Stress Improvement (IHSI) -

The licensee elected to perform IHSI on all new stainless steel RECIRC, RHR and RWCU welds. NUTECH is the IHSI contractor. The inspectors reviewed/examined the following activities relative to the IHSI program:

(1) The following NUTECH documents were briefly reviewed to assure that QA control procedures and detailed instructions/procedures were in place to control the IHSI process:

- NUTECH Quality Assurance Manual

- NUTECH document NTC-02-003, R3, "Process Specification for Induction Heating Stress Improvement"

- NUTECH Procedure XGP-08-107, R1, "Thermocouple Setting Procedure for the Edwin I. Hatch Nuclear Plant - Unit 2"

- NUTECH Procedure XGP-08-106, R0, "Procedure for Heating Stress Improvement at the Hatch Nuclear Power Plant"

(2) In-process IHSI of RWCU weld 6-14 was observed.

(3) IHSI data package for completed RWCU weld 6-1 was reviewed.

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

5. Inservice Inspection - Review of Program (73051) (Unit 2)

The inspectors reviewed the licensee's inservice inspection (ISI) program for the current outage in the areas indicated below. In accordance with the updated program (submitted to NRC on August 12, 1983), the applicable code is the ASME Boiler and Pressure Vessel Code, Section XI, 1980 Edition with Addenda thru W80. Southern Company Services (SCS) has the responsibility as the ISI contractor. Two separate inspection plans, one for the regular and augmented ISI, and one for the PSI of the replacement piping, were being used.

a. The inspectors reviewed the inspection plans listed in b. below to determine whether the plans had been approved by the licensee.

b. The inspectors reviewed the following GP and SCS documents relative to the ISI program. Except for the Examination Plans, these documents were reviewed during the inspection documented by Region II report 50-366/83-14. During the current inspection, only changes to the documents since the last inspection were reviewed.

(1) SCS "ASME Section XI Baseline Nondestructive Examination Plan for the Replacement Piping - Edwin I. Hatch Nuclear Plant Unit 2"

(2) SCS "Nondestructive Examination Outage Plan - Edwin I. Hatch Nuclear Plant Unit 2"

(3) HNP QA-03-02, Revision 9, "Training and Personnel Qualifications"

(4) HNP QA-05-01, Revision 7, "Field Audits"

(5) HNP-6, Revision 10, "Plant Review Board Administrative Procedures"

(6) HNP-9, Revision 25, "Procedure Writing Use and Control"

(7) HNP-10, Revision 13, "Document Distribution and Control"

(8) HNP-820, Revision 14, "Plant Records Management"

(9) HNP-907, Revision 3, "Inservice Inspection Visual Examination Surveillance Procedure for Classes 1, 2, and 3 Pipe Supports"

(10) SCS ADM-H/F-200, Revision 1, "Plan and Revisions"

(11) SCS ADM-H/F-201, Revision 1, "Program and Revisions"

(12) SCS ADM-H/F-203, Revision 0, "Design Change Review"

(13) SCS ADM-H/F-204, Revision 1, "Nondestructive Examination Outage"

(14) SCS ADM-H/F-205, Revision 1, "Indication Notification"

(15) SCS ADM-H/F-206, Revision 1, "Deviations to SCS Inservice Inspection and Inservice Testing Procedures, Plans, and Programs"

(16) SCS ADM-H/F-207, Revision 1, "Final Report Preparation"

(17) SCS ADM-H/F-208, Revision 0, "Data Control"

(18) SCS ADM-H/F-211, Revision 0, "The Georgia Power/Southern Company Services ISI/NDE Program Responsibilities for the Edwin I. Hatch Nuclear Plant - Units 1 and 2"

(19) SCS ADM-H/F/V-212, Revision 0, "Nonconformance Items"

(20) SCS AUX-H/F/V-300, Revision 2, "Procedure (written practice) for Qualification of Nondestructive Personnel"

(21) SCS AUX-H-301, Revisions 3 and 4, "Measuring and Recording Search Unit Location During Manual Ultrasonic Examinations"

(22) SCS AUX-H/F/V-302, Revision 2, Deviation 1, "Preservice and Inservice Inspection Documentation"

(23) SCS GEN-H/F/V-100, Revision 1, "Procedure Numbering System"

(24) SCS GEN-H/F/V-101, Revision 1, "Filing System"

(25) SCS GEN-H/F/V-102, Revision 3, "Procedure Development and Revision"

(26) SCS UT-H/F/V-450, Revision 3, "Qualification of Manual Ultrasonic Equipment"

These documents were reviewed to assure that procedures and plans had been established (written, reviewed, approved and issued) to control and accomplish the following activities:

- Organizational structure including qualifications, training, responsibilities, and duties of personnel responsible for ISI
- Audits including procedures, frequency, and qualification of personnel
- General QA requirements including examination report, deviations from previously established program, material certifications and identification of components to be covered
- Work and inspection procedures
- Control of processes including suitably controlled work conditions, special methods, and use of qualified personnel
- Corrective action
- Document control
- Control of examination equipment
- Quality records including documentation of indications and NDE findings, review of documentation, provisions to assure legibility and retrievability, and corrective action
- Scope of the inspection including description of areas to be examined, examination category, method of inspection, extent of examinations, and justification for any exception

- Definition of inspection interval and extent of examination
- Qualification of NDE personnel
- Controls of generation, approval, custody, storage and maintenance of NDE records

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

6. Inservice Inspection - Review of Procedures (73052B) (Unit 2)

The inspectors reviewed the ISI procedures indicated below to determine whether the procedures were consistent with regulatory requirements and licensee commitments. See paragraph 5 above for the applicable code.

Procedures UT-H-400, revision 4, and UT-H-401, revision 3, deviation 001, were reviewed for procedure technical content relative to: type of apparatus, extent of coverage including beam angles and scanning techniques, calibration requirements, search units, DAC curves, transfer requirements, reference level for monitoring discontinuities, method of demonstrating penetration, levels of evaluation and recording indications, and acceptance standards.

In addition, the above UT procedures were reviewed to determine whether guidelines necessary for detecting and evaluating intergranular stress corrosion cracking (IGSCC) (i.e., equipment, recording levels, evaluation levels, etc.), as developed during demonstration on Nine Mile Point (NMP) cracked samples at Battelle, had been incorporated.

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

7. Inservice Inspection - Observation of Work and Work Activities (73753B) (Unit 2)

The inspectors observed the ISI activities described below to determine whether these activities were being performed in accordance with regulatory requirements and licensee procedures. See paragraph 5 above for the applicable code.

a. A portion of the in-process ultrasonic (UT) inspection was observed for the following welds:

2B31-1RC-12AR-F-5
2B31-1RC-12AR-G-5
2B31-1RC-12AR-H-5
2B31-1RC-12AR-J-5
2B31-1RC-12AR-K-5

The inspections were compared with applicable procedures in the following areas:

(1) Availability of and compliance with approved NDE procedure
(2) Use of knowledgeable NDE personnel
(3) Use of NDE personnel qualified to the proper level
(4) Recording of inspection results
(5) Type of apparatus used
(6) Extent of coverage of weldment
(7) Calibration requirements
(8) Search units
(9) Beam angles
(10) DAC curves
(11) Reference level of monitoring discontinuities
(12) Method of demonstrating penetration
(13) Limits of evaluating and recording indications
(14) Recording significant indications
(15) Acceptance limits

These welds are RECIRC system nozzle to safe-end welds and were part of augmented inspections performed as a result of IGSCC found in the nozzle inconel buttering on similar welds at other sites. UT indications were found during the examination, but were still being evaluated at the conclusion of the inspection. In addition to witnessing the in-process UT inspections, the inspectors witnessed SCS demonstrate their ability to UT inspect the inconel butter on nozzle mockups. This demonstration consisted of setting up on the appropriate calibration blocks in accordance with the UT procedure and then scanning inconel buttered nozzle mockups to determine if notches on the I.D. of the butter could detected. The notches were readily detectable. The inspectors also set up Region II equipment on the nozzle butter I.D. notches. The notches were readily detectable with Region II equipment. See paragraph 4 above for additional inspections performed by Region II.

b. Based on cracking found at other sites, the licensee performed augmented ISI PT and UT inspections on the jet pump instrument nozzle to safe-end and safe-end to penetration seal welds and adjacent base material. The PT inspection revealed one 1/8" long indication in the "A" nozzle to safe-end weld. At the time of the inspection, the licensee indicated that the indication did not appear to be significant. The UT inspection revealed several axial indications in both "A" and "B" safe-ends. During the inspection, SCS performed additional inspections to try to determine the cause of the UT Indications. The inspectors observed some of the evaluation inspections on nozzle "B" safe-end (weld 2B31-1RC-4JP-B-2). At the conclusion of the inspection, the cause of the UT indications had not been determined. On July 2, 1984, Region II discussed the status of the indications with the licensee and SCS. The cause of the indications had not been identified, but based on supplemental inspections and other factors such as safe-end material containing low carbon (.026%), the licensee had

concluded that indications were not caused by cracks. SCS indicated that further supplemental work would be done to try to explain the indications. The final resolution of these indications will be reviewed during a future inspection. This matter is identified as Inspector Followup Item 366/84-23-01, Resolution of Indications in Jet Pump Instrument Nozzle Safe-ends.

c. In-process liquid penetrant (PT) inspection was observed for the following welds:

2B31-1RC-28B-1
2B31-1RC-12AR-J-5
2B31-1RC-12AR-K-5

The inspection was compared with applicable procedures in the following areas:

(1) Availability of and compliance with approved NDE Procedures
(2) Use of knowledgeable NDE personnel
(3) Use of NDE personnel qualified to the proper level
(4) Recording of inspection results
(5) Method consistent with procedure
(6) Penetrant materials identified and consistent with ASME Code
(7) Certification of sulfur and halogen content for penetrant materials
(8) Surface preparation
(9) Drying time following surface temperature
(10) Penetrant application and penetration time
(11) Examination surface temperature
(12) Penetrant removal
(13) Drying of surface prior to developing
(14) Developer type, application and time interval after penetration removal
(15) Time interval between developer application and evaluation
(16) Evaluation technique
(17) Reporting examination results

d. Personnel qualification records for two Level I, six Level II, and one Level III examiners were reviewed.

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

8. Inspection Followup Items (92701B) (Units 1 and 2)

a. (Closed) Inspector Followup Item 366/84-03-03, AWS Undercut Requirements. This item pertained to the fact that the NNI Visual (VT) inspection procedure 1918-V-N001 allowed 1/32" maximum undercut for all AWS welds, whereas the applicable edition of AWS A1.1 requires that undercut be no more than 0.01 inches deep when its direction is transverse to the primary tensile stress. At the time this discrepancy was noted, no AWS welds had been made. During this inspection, the

inspector noted that the NNI general welding instruction (W001) had been changed to agree with AWS D1.1, but that the VT procedure had not been changed. This finding occurred at the end of the inspection and it could not be readily determined whether the VT procedure had been used to accept welds where the more stringent undercut requirement applied. Pending determination of whether the procedure was used to accept AWS welds requiring the more stringent undercut limits, this matter is identified as Unresolved Item 366/84-23-02, AWS Undercut Requirements.

b. (Closed) Inspector Followup Item 321, 366/82-08-04, Implementation of NUREG 0313 - Generic letter 81-04. NRC has completed the review and evaluation of responses to NUREG 0313 - Generic letter 81-04 (see SER dated May 29, 1984) and concluded that GP responses did not fully meet NUREG-0313. However, the SER concluded that based on recent industry experience and activities to mitigate IGSCC, the questions regarding whether or not NUREG-0313 guidelines are being met is moot at this time.

c. (Open) Inspector Followup Item 366/84-04-02, UT Indication in Feedwater Nozzle Weld 2B21-1FW-12AA-12. See paragraph 4.a. for inspections performed. This item remains open pending review of revised program to show augmented inspections.