



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

Report Nos.: 50-348/89-25 and 50-364/89-25

Licensee: Alabama Power Company
600 North 18th Street
Birmingham, Al 35291-0400

Docket Nos.: 50-348 and 50-364

License Nos.: NPF-2 and NPF-8

Facility Name: Farley 1 and 2

Inspection Conducted: October 2 thru 6, 1989

Inspectors: Ronald W. Newsome 10-16-89
R. W. Newsome Date Signed

R. P. Carrion 16 Oct '89
R. P. Carrion Date Signed

Approved by: J. J. Blake 10/19/89
J. J. Blake, Chief Date Signed
Materials and Processes Section
Engineering Branch
Division of Reactor Safety

SUMMARY

Scope:

This routine, announced inspection was conducted in the areas of Inservice Inspection (ISI) including the eddy current examination of the Unit 1 Steam Generator (SG) tubing. The inspection included a review of the Unit 1 ISI inspection plan for this outage; reviews of nondestructive examination (NDE) procedures; observations of in-progress NDE examinations; independent examination verifications; reviews of NDE personnel qualifications; reviews of NDE equipment calibration and material certification documentation; and, a review of completed NDE examination data. Also, NRC previously opened items were addressed.

Results:

In the areas inspected, violations or deviations were not identified.

This inspection indicated that ISI nondestructive examinations were being conducted adequately.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

- *R. Casey, Systems Performance Supervisor
- T. Cherry, Instrumentation and Controls Supervisor
- *L. Enfinger, Plant Administration Manager
- *S. Fulmer, Safety, Audit, and Engineering Review Supervisor
- *D. Hartline, Systems Performance Engineering Supervisor
- *R. Hill, Assistant General Manager, Operations
- *C. Levy, General Plant Engineer
- *D. Morey, General Manager, Operations
- *C. Nesbitt, Technical Manager
- *J. Osterholtz, Manager Operations
- *J. Thomas, Maintenance Manager

Other licensee employees contacted during this inspection included craftsmen, engineers, security force members, technicians, and administrative personnel.

Other Organizations

- J. Campbell, ISI Coordinator, Westinghouse Electric Corp. (W)
- E. Conrad, Westinghouse Electric Technician
- L. McClain, Southern Company Services, Level III

NRC Resident Inspectors

- *G. Maxwell, Senior Resident Inspector
- W. Miller, Resident Inspector

*Attended exit interview

Acronyms and Initialisms used throughout this report are listed in the last paragraph.

2. Inservice Inspection (ISI)

The inspectors reviewed documents and records, conducted independent evaluations, and observed activities, as indicated below, to determine whether ISI was being conducted in accordance with applicable procedures, regulatory requirements, and licensee commitments. The applicable code for ISI is the American Society of Mechanical Engineers Boiler and

Pressure Vessel (ASME B&PV) Code, Section XI, 1983 edition with addenda through Summer 1983. Alabama Power personnel are primarily acting as coordinators for contractor personnel. Westinghouse has the primary responsibility as the ISI contractor for conducting the ultrasonic (UT), liquid penetrant (PT), magnetic particle (MT), visual (VT), and primary eddy current (EC) steam generator tubing data evaluation and collection while Conam Inspection is conducting a second evaluation of all the bobbin coil EC data. Southern Company Services is performing overview functions for the licensee in all ISI NDE areas.

a. ISI Program/Plan Review, Unit 1 (73051)

The inspectors reviewed the inspection plan for this outage, Unit 1 Inservice Inspection Interval-2 Period-1 Outage-2 RF-9, to determine whether the program/plan had been approved by the licensee and to assure that procedures and plans had been established (written, reviewed, approved and issued) to control and accomplish the following applicable activities: organizational structure including qualifications, training, responsibilities, and duties of personnel responsible for ISI; audits including procedures, frequency, and qualification of personnel; general Quality Assurance requirements including examination reports, 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; and, controls of generation, approval, custody, storage and maintenance of NDE records.

The review of the ISI plan indicated that the plan was properly approved and contained the necessary information.

b. Review of NDE Procedures, Units 1 and 2 (73052)

- (1) The inspectors reviewed the procedures listed below to determine whether these procedures were consistent with regulatory requirements and licensee commitments. The procedures were also reviewed in the areas of procedure approval, requirements for qualification of NDE personnel, and compilation of required records; and, if applicable, division of responsibility between the licensee and contractor personnel if contractor personnel are involved in the ISI effort.

- FNP-0-NDE-157.1 (R1) Preservice and Inservice Inspection Documentation 1983 Code
- FNP-0-NDE-157.2 (R1) Qualification of Ultrasonic Manual Equipment 1983 Code
- FNP-0-NDE-157.5 (R1) Manual Ultrasonic Examination of Bolts, Studs and Nuts 1983 Code
- FNP-0-NDE-157.7 (R2) Manual Ultrasonic Examination of Welds In Vessels 1983 Code
- FNP-0-NDE-157.12 (R1) Manual Ultrasonic Examination of Welds 1983 Code
- FNP-0-NDE-157.14 (R2) Manual Ultrasonic Examination of Welds In Cast Stainless Steel Pipe 1983 Code
- FNP-0-NDE-157.17 (R2) Manual Ultrasonic Examination Of Inner Radius Corners 1983 Code
- FNP-0-NDE-157.18 (R2) Ultrasonic Examination of Studs and Bolts from the Bore Hole 1983 Code
- FNP-0-NDE-157.4 (R1) Liquid Penetrant Examination 1983 Code
- FNP-0-NDE-157.11 (R2) Magnetic Particle Examinations 1983 Code
- FNP-0-NDE-157.3 (R1) Visual Examination VT-1 1983 Code
- FNP-0-NDE-157.16 (R1) Visual Examination VT-3 1983 Code
- ALA-1 (R0) Data Analysis Guidelines
- FNP-1-STP-159.0 (R6) Steam Generator Eddy Current Inspection And Mechanical Plugging
- MSR 2.2.2 APC-2 (R2) Steam Generator Tubesheet Marking
- MRS 2.4.2 APC-6 (R4) Digital Multi-Frequency Eddy Current Inspection of Preservice and Inservice Heat Exchanger Tubing

All procedures listed above have been reviewed during previous NRC inspections. Only current revisions were reviewed during this inspection.

- (2) The inspectors reviewed the Ultrasonic procedures to ascertain whether they had been reviewed and approved in accordance with the licensee's established QA procedures. The procedures were also reviewed for technical adequacy and conformance with ASME, Section V, Article 5, and other licensee commitments/requirements in the following areas: type of apparatus used; extent of coverage of weldment; calibration requirements; search units; beam angles; DAC curves; reference level for monitoring discontinuities; method for demonstrating penetration; limits for evaluating and recording indications; recording significant indications; and, acceptance limits.
- (3) The inspectors reviewed the Liquid Penetrant procedure to ascertain whether it had been reviewed and approved in accordance with the licensee's established QA procedures. The procedure was also reviewed for technical adequacy and conformance with ASME, Section V, Article 6, and other licensee commitments/requirements in the following areas: specified method; penetrant material identification; penetrant materials analyzed for sulfur; penetrant materials analyzed for total halogens; surface temperature; acceptable pre-examination surface conditioning; method used for pre-examination surface cleaning; surface drying time prior to penetrant application; method of penetrant application; penetrant dwell time; method used for excess penetrant removal; surface drying prior to developer application, if applicable; type of developer; examination technique; evaluation techniques; and, procedure requalification.
- (4) The inspectors reviewed the Magnetic Particle procedure to ascertain whether it had been reviewed and approved in accordance with the licensee's established QA procedures. The procedure was reviewed for technical adequacy and for conformance with the ASME Code Section V, Article 7, and other licensee commitments/requirements in the following areas: examination methods; contrast of dry powder particle color with background; surface temperature; suspension medium and surface temperature requirement for wet particles; viewing conditions; examination overlap and directions; pole or prod spacing; current or lifting power (yoke); and, acceptance criteria.
- (5) The inspectors reviewed the Visual examination procedures to determine whether they contained sufficient instructions to assure that the following parameters were specified and controlled within the limits permitted by the applicable code, standard, or any other specification requirement: method - direct visual, remote visual or translucent visual; application -

hydrostatic testing, fabrication procedure, visual examination of welds, leak testing, etc.; how visual examination is to be performed; type of surface condition available; method or implement used for surface preparation, if any; whether direct or remote viewing is used; sequence of performing examination, when applicable; data to be tabulated, if any; acceptance criteria is specified and consistent with the applicable code section or controlling specification; and, report form completion.

- (6) The inspectors reviewed the Eddy Current procedures for technical content relative to: multichannel examination unit, multichannel examination indication equipment is specified, examination sensitivity, method of examination, method of calibration and calibration sequence, and acceptance criteria.

All procedures reviewed appeared to contain the necessary elements for conducting the specific examination.

c. Observation of Work and Work Activities, Unit 1 (73753)

The inspectors observed work activities, reviewed certification records of NDE equipment and materials, and reviewed NDE personnel qualifications for personnel that had been utilized during the required ISI examinations during this outage. The observations and reviews conducted by the inspectors are documented below.

- (1) The inspectors observed calibration activities and the in-process ultrasonic (UT) examinations being conducted on 3 Steam Generator Feedwater welds by W examiners. These observations were compared with the applicable procedures and the ASME B&PV Code in the following areas: availability of and compliance with approved NDE procedures; use of knowledgeable NDE personnel; use of NDE personnel qualified to the proper level; type of apparatus used; calibration requirements; search units; beam angles; DAC curves; reference level for monitoring discontinuities; method of demonstrating penetration; extent of weld/component examination coverage; limits of evaluating and recording indications; recording significant indications; and, acceptance limits.

The inspectors conducted an independent ultrasonic verification examination, using W equipment, on portions of 2 of the Feedwater welds previously observed being examined by W ultrasonic examiners. These examinations were conducted in order to evaluate the technical adequacy of the ultrasonic examination procedure being used by the licensee and to assess the validity of the information being reported by the ultrasonic examiners.

The verification ultrasonic examinations conducted by the inspectors indicated that the procedure being used to conduct the examinations is adequate and the verification examination results compared favorably with the information being reported by the ultrasonic examiners.

The following listed ultrasonic equipment and materials certification records were reviewed:

Ultrasonic Instruments

<u>Manufacturer/Model</u>	<u>Serial No.</u>
Sonic/MK II	08053E
Sonic/MK II	00880E
Sonic/MK II	07853E

The inspectors reviewed spectrum analysis data for the ultrasonic transducers listed below:

<u>Serial No.</u>	<u>Size</u>	<u>Frequency</u>
56758	.5"	2.25 MHz
A25256	.5"	2.25 MHz

Ultrasonic Couplant Batch Number 8874

Ultrasonic Calibration Blocks ALA-23, ALA-24, and ALA-25

- (2) The inspectors observed the in process liquid penetrant (PT) examinations of 2 RHR circumferential welds, sketch ALA2-4501 welds 2 and 3. The observations were compared with the applicable procedure and the ASME B&PV Code in the following areas: specified method, penetrant materials identified; penetrant materials analyzed for halogens and sulfur; acceptable pre-examination surface; surface temperature; surface drying time prior to penetrant application; method of penetrant application; penetrant dwell time; method used for excess penetrant removal; surface drying prior to developing, if applicable; type of developer; examination technique; evaluation technique; and, reporting of examination results.

The NRC inspectors re-evaluated these welds following the PT examiners evaluation of the welds but prior to the developer being removed from the weld surfaces. This re-evaluation was conducted in order to determine if the evaluations performed by the PT examiners was in accordance with the applicable procedure acceptance criteria and to determine if the examination results were being reported as required. The re-evaluations conducted by the NRC inspectors indicated that the proper evaluation was made by the PT examiners and that the examination results were being reported as required.

The inspectors review of the below listed liquid penetrant materials certification records indicated that the sulfur and halogen content of the material was within acceptable content limits.

<u>Materials</u>	<u>Batch Number</u>
Liquid Penetrant	88E038
Cleaner/Remover	88G017
Developer	88B019

- (3) The inspectors observed the in-process magnetic particle (MT) examinations of 3 Steam Generator Feedwater circumferential welds. The observations were compared with the applicable procedures and the Code in the following areas: examination methods; contrast of dry powder particle color with background; surface temperature; suspension medium for wet particles, if applicable; viewing conditions; examination overlap and directions; pole or prod spacing; current or lifting power (yoke); and acceptance criteria.

The inspectors conducted MT verification examinations, using W equipment, on portions of 2 of the welds previously observed being examined by W personnel. The examinations were conducted in order to evaluate the technical adequacy of the examination procedure being used by the licensee to perform examinations and to assess the validity of the information being reported by the MT examiners.

The information reported by the MT examiners compared favorably with the verification examinations.

The inspectors reviewed documentation indicating that a 10 pound lift test had been performed on magnetic particle alternating current (AC) yoke W04670. The certification record for the lift test plate that was used to conduct the test, NSD-0084, was reviewed to confirm the weight of the test plate.

A review of the magnetic particle material certification record for batch number 86G028 indicated the particles met the applicable specifications requirements.

- (4) The inspectors observed 18 in-process visual (VT) examinations. These examinations included pipe supports, pipe foundations, and piping welds in three different piping systems. These observations were made to: determine whether the applicable drawing, instructions or travelers clearly specify the procedure to be used and that a copy of the procedure is available in the area where the work is being performed; identify for record

review the personnel performing the examination and ascertain whether they are qualified to perform the assigned task; determine whether the required tools and examination aids (as specified in the examination procedure) are available at the work location; determine whether the specific areas, locations and extent of examination are clearly defined; determine whether the test attributes are as specified in the applicable test procedure; ascertain whether the defects are evaluated in accordance with the procedure requirements, correct acceptance criteria is used, and the inspection results are reported in a prescribed manner.

The NRC inspectors conducted independent examinations on 12 of the items previously observed being examined by W personnel. These examinations were conducted in order to evaluate the adequacy of the examination procedure being used by the licensee's contractor and to assess the validity of the information being reported by the examiners.

These re-examinations generally agreed with the results reported by the W visual examiners.

(5) Steam Generator Tubing Eddy Current Examination

The inspectors observed the EC activities indicated below. The observations were compared with the applicable procedures and the Code in the following areas: method for maximum sensitive is applied; method of examination has been recorded; examination equipment has been calibrated in accordance with the applicable performance reference; amplitude and phase angle have been calibrated with the proper calibration reference and is recalibrated at predetermined frequency; required coverage of steam generator tubes occurs during the examination; acceptance criteria is specified or referenced and is consistent with the procedure or the ASME Code; and, results are consistent with the acceptance criteria.

- (a) Steam generator tube eddy current data collection was being accomplished by W personnel. In-process tube data acquisition, including calibration confirmation and tube location verifications, was observed for 45 SG tubes, 15 in each SG.
- (b) In-process eddy current data evaluation, including calibration confirmation, was observed for 56 SG tubes. Primary data analysis, being conducted by W, was observed for 30 SG tubes, 10 tubes in each SG. Secondary data analysis, being conducted by Conam, was observed for 26 SG tubes, 23 in SG-A and 3 in SG-C.

The NRC inspectors co-evaluated 10 of the SG tubes during the observations of the primary and secondary analysts evaluations, 4 in SG-A, 2 in SG-B, and 4 in SG-C. The sample of evaluations, some having reportable indications and some with no reported indications, was conducted in order to confirm the validity of the reported tubing condition. The co-evaluation analysis conducted by the inspectors agreed well with the reported results.

Certification records for EC calibration standards S-2635, Z-5094, and Z-3173 were reviewed for material type, correct fabrication, and artificial flaw location and size.

The licensee has identified two suspect heats of material (4523 and 3962) used by Westinghouse to manufacture Steam Generator tube plugs. Twenty three (23) of these plugs are installed in the three Unit 1 steam generators, 8 in SG A, 1 in SG B, and 14 in SG C. The licensee intends to remove and replace all 23 of these suspect plugs during this outage.

- (6) The inspectors reviewed personnel qualification documentation for 5 UT examiners, 2 PT examiners, 2 MT examiners, 5 VT examiners, 3 W EC data collection personnel, 3 W EC data analysts, and 3 Conam EC data analysts. These personnel qualifications were reviewed in the following areas: employer's name; person certified; activity qualified to perform; current period of certification; signature of employer's designated representative; basis used for certification; and, annual visual acuity, color vision examination, and periodic recertification.
- d. Data Review and Evaluation, Unit 1 (73755)
- (1) Records of completed ISI nondestructive examinations for 19 UT, 13 PT, 12 MT, and 18 VT examinations were selected and reviewed to ascertain whether: the methods(s), technique, and extent of the examination complied with the ISI plan and applicable NDE procedures; findings were properly recorded and evaluated by qualified personnel; programmatic deviations were recorded as required; personnel, instruments, calibration blocks, and NDE materials (penetrants, couplants) were designated.
 - (2) The inspectors reviewed the eddy current data analysis results and a sample of associated completed records for 60 SG tubes, 20 tubes from each of three Steam Generators. The reviews were compared with the applicable procedures and the ASME B&PV Code in the following areas: the multichannel eddy current examination equipment has been identified; material permeability has been recorded; method of examination has been recorded; and, results are consistent with acceptance criteria.

All of the examination reports reviewed appeared to contain the required examination information including disposition of indications, if any.

A random sample of current examination results were compared with historical examination results. No major discrepancies were noted during the comparison.

In the areas inspected, violations or deviations were not identified.

3. Licensee Action on Previously Opened Items (92701)(92702)

(Closed) Violation 50-348,364/89-10-01: "Failure to Provide and Follow Maintenance Procedures"

This violation is generic in nature and was documented by four examples:

- a) A Temporary Change Notice (TCN) was improperly processed to Maintenance Procedure FNP-0-MP-28.116 in that it was not done in compliance with Procedure FNP-0-AP-1, "Development, Review, and Approval of Plant Procedures." Specifically, the proper level of management did not approve the TCN prior to its implementation. The TCN deleted the requirement to calibrate safety-related DC circuit breakers, resulting in their non-calibration for several years, some since plant startup.
- b) Erroneous steps in Procedure FNP-0-MP-7 were signed off as complete while performing maintenance activities on the Unit 2 turbine driven auxiliary feedwater pump. In fact, these steps were not and should not have been performed. Additionally, they should have been deleted from the procedure via revision to bring the procedure into accord with the manufacturer's design modification.
- c) Orifice plates were installed backwards due to inadequate maintenance procedures.
- d) Welding repair to a fire door was done using Welding Procedure CSM-10, which called for too high amperage (and hence too high heat) for the thin metal being welded. The welder did not follow the procedure and did the work at a lower amperage. He made no effort to change the procedure or look for a more appropriate one. (Fortunately, due to his experience and expertise, he was able to properly effect the repair.)

These four items were specifically addressed, as was the larger question of providing and following maintenance procedures, by Corrective Action Report (CAR) 1686, Revision 0, dated August 24, 1989 and the Alabama Power Company letter from Mr. W. G. Hairston, III, Senior Vice President, Nuclear Operations, dated August 30, 1989 to the NRC. The CAR and the letter reviewed the reasons for the violation, the corrective actions taken to alleviate the adverse conditions, the results achieved, and the

commitments/corrective steps taken to prevent future violations, including training sessions, conducted by the Maintenance Manager for all maintenance personnel, to emphasize the necessity of strict procedural compliance. Training records provided to the inspectors indicate that the training sessions were completed in September, 1989. Therefore, Violation 50-348,364/89-10-01 is considered closed.

(Open) Inspector Followup Item 50-348,364/89-10-03: "Adequacy of Action to Prevent End-Use Devices from Poor Quality Instrument Air"

The licensee has issued Instrument Maintenance Procedure FNP-1-IMP-0.11, Revision 6, dated September 21, 1989, entitled "Instrument Airline and Pressure Regulator Preventive Maintenance Procedure." Also, the licensee continues writing an amended response to Generic Letter 88-14, which addresses the issue of Instrument Air Quality. Therefore, this item remains open pending licensee response.

(Open) Inspector Followup Item 50-348,364/89-10-04: "Lack of Operability Requirements for Emergency Air Compressor"

Because no appreciable action has been taken by the licensee on this issue since it was last reviewed in early September by an NRC inspector, this item remains open.

(Open) Inspector Followup Item 50-348,364/89-10-05: "ASME Section XI Procedure Interface"

This item addresses three separate procedure interface concerns originally raised by the NRC Maintenance Team. The status of each concern is discussed below:

- 1) Confusion due to poor wording of Procedure FNP-0-GMP-0.2, Appendix A, Section 4.0, Revision 1, concerning required Section XI compliance for routine maintenance activities, has been clarified by Revision 3, issued August 29, 1989.
- 2) Section 7.5.9 of AP-52 addresses test and restoration from work involving ASME Classes 1,2, or 3 systems or components or their supports. It also references Appendix III for post-maintenance requirements. However, while alignment verification is addressed, valve stroke testing and pump performance testing are not. While correct guidance should be included in FNP-0-GMP-0.2 and Appendix III of AP-52, the licensee has implemented a Post Maintenance Test Program. Within the program, all procedures have been written, but only about 10% of 200 have been approved and are in use, while those remaining are in the review and approval process, expected to be issued by December, 1989.
- 3) Because neither FNP-0-AP-53 nor FNP-0-GMP-1 include guidance for the case where the preventive maintenance vibration analysis applies to a Section XI pump, the FNP System Performance Group issued Engineering

Technical Procedure FNP-0-ETP-4321, Revision 0, dated September 13, 1989, entitled, "Guidelines for the Analysis of Machinery Vibration." This procedure provides instruction for ASME Section XI vibration evaluations as well as for non-Code related vibration evaluations, including alert and action vibration ranges, and trending to predict machinery component degradation.

This item remains open pending further review of the second concern. The first and third concerns appear to have been satisfactorily addressed.

4. Exit Interview

The inspection scope and results were summarized on October 6, 1989, with those persons indicated in paragraph 1. The inspectors described the areas inspected and discussed in detail the inspection results. Although reviewed during this inspection, proprietary information is not contained in this report. Dissenting comments were not received from the licensee.

5. Acronyms and Initialisms

AC - Alternating Current
 ASME - American Society of Mechanical Engineers
 B&PV - Boiler and Pressure Vessel
 CAR - Corrective Action Report
 DAC - Distance Amplitude Curve
 DC - Direct Current
 EC - Eddy Current
 ISI - Inservice Inspection
 MT - Magnetic particle
 MHz - Megahertz
 NDE - Nondestructive Examination
 No. - Number
 NRC - Nuclear Regulatory Commission
 PT - Liquid penetrant
 QA - Quality Assurance
 R - Revision
 RF - Refueling
 RHR - Residual Heat Removal
 SG - Steam Generator
 TCN - Temporary Change Notice
 UT - Ultrasonic
 VT - Visual
 W - Westinghouse Electric Corporation