



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W., SUITE 2900
ATLANTA, GEORGIA 30323-0199

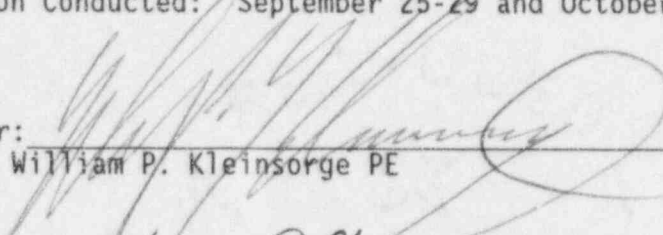
Report Nos.: 50-348/95-17 and 50-364/95-17

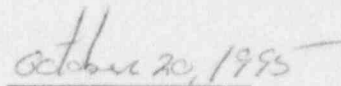
Licensee: Southern Nuclear Operating Company, Inc.
600 North 18th Street
Birmingham, AL 35291-0400

Docket Nos.: 50-348 and 50-364 License Nos.: NPF-2 and NPF-8
Facility Name: Joseph M. Farley Nuclear Plant Units 1 and 2

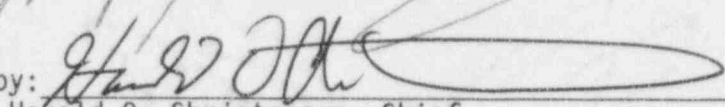
Inspection Conducted: September 25-29 and October 10-12, 1995

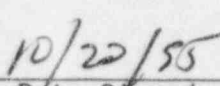
Inspector:


William P. Kleinsorge PE


Date Signed

Approved by:


Harold O. Christensen, Chief
Maintenance Branch
Division of Reactor Safety


Date Signed

SUMMARY

Scope:

This routine, announced inspection was conducted in the areas of Inservice Inspection (ISI), Flow Accelerated Corrosion (FAC) and turbine building cooler piping.

Results:

ISI procedures were well written and appropriate for their intended application. ISI examinations were satisfactorily conducted by properly qualified personnel in accordance with appropriate procedures. Records reflected the accomplishment of examinations in accordance with procedural requirements and regulatory commitments.

The licensee has established, and continues to implement an effective program to maintain high energy carbon steel piping systems within acceptable wall thickness limits.

In the areas inspected, no violations or deviations were identified.

REPORT DETAILS

1. Persons Contacted

Southern Nuclear Operating Company (SNC) Personnel:

- B. Badham, Senior Engineer
- *M. Belford, Engineering Supervisor
- *D. Grissete, Operations Manager
- D. Hartline, Senior Engineer
- *K. Hill, General Manager - Farley Nuclear Plant
- *A. Livingston, Chemical Engineering Supervisor
- *S. Mayfield, Senior Project Engineer
- *E. McLane, NDE Level III
- *R. Monk, Engineering Support Supervisor - Equipment Evaluation
- *C. Nesbitt, Assistant General Manager - Plant Support
- *L. Stinson, Assistant General Manager - Plant Operations
- *J. Thomas, Engineering Support Manager
- *G. Waymire, Safety Audit and Engineering Review Site Supervisor
- *R. Yance, Plant Modifications and Design Manager

Westinghouse Company (W) Personnel:

- *K. Patton, Site Services Manager

NRC Personnel:

- T. Ross, Senior Resident Inspector
- M. Scott, Resident Inspector

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

- *Attended exit interview

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

2. Inservice Inspection (ISI) (73753)

The inspector reviewed documents and records, 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, for Unit 1 and Unit 2 is the ASME B&PV Code, Section XI, 1983 Edition with Addenda through the Summer 1983 (83S83). Unit 1 is in refueling outage (RFO) 13, the first outage of the third 40-month period of the second ten-year interval (01,P3,I2) ending December 1, 1997. Unit 2 is operating in fuel cycle 11, and second 40-month period, of the second ten-year interval (P2,I2) ending July 1,

2001. Unit 1 was granted a construction permit August 16, 1972, received its Operating License June 25, 1977, and commenced commercial operations on December 1, 1977. Unit 2 was granted a construction permit August 16, 1972, received its Operating License on March 31, 1981, and commenced commercial operations on July 30, 1981.

Westinghouse Company (W) nondestructive examination (NDE) personnel, were performing liquid penetrant (PT), magnetic particle (MT), ultrasonic (UT), visual (VT), and eddy current (ET) examination under the umbrella of the W Quality Assurance (QA) Program.

a. ISI Program Review, Units 1 and 2

The inspector reviewed the following documents relating to the ISI program to determine whether the plan had been approved by the licensee and to assure that procedures and plans had been established for the applicable activities.

Documents Reviewed

ID	Rev.	Title
FNP-1-M-045	8	Second Ten Year Inspection Plan for ASME Class 1 & 2 Systems and Components
FNP-1-M-043	4	Second Ten Year Inservice Inspection Program for ASME Code Class 1, 2, and 3 Components

These documents were well written and appropriate for their intended application.

b. Review of NDE Procedures, Units 1 and 2

The inspector reviewed the procedures listed below to determine whether these procedures were consistent with regulatory requirements and licensee commitments. The procedures were also reviewed for technical content. The following procedure revisions have not been previously reviewed by the NRC.

Procedures Examined

ID	Rev.	Title/Subject
FNP-0-NDE-100.5 w/ TCN 1B 5/25/95	1	Liquid penetrant Examination
FNP-0-NDE-100.11 9/20/95	1	Magnetic Particle Examination
FNP-0-NDE-100.21 2/21/94	0	Visual Examination VT-1
FNP-0-NDE-100.23 2/21/94	0	Visual Examination VT-3

Procedures Examined

ID	Rev.	Title/Subject
FNP-0-NDE-100.31 8/31/95	2	Manual Ultrasonic Examination of Full-penetration Welds (0.200 to 6.0 Inches)
FNP-0-NDE-100.32 9/1/95	3	Qualification of Manual Ultrasonic Instruments
FNP-0-NDE-100.34 8/31/95	2	Manual Ultrasonic Examination of Welds in Vessels
<input type="checkbox"/>		As discussed in NRC Inspection Report 348,364/95-07, paragraph 2B, FNP-0-NDE-100.5 Revision 0, inappropriately required analysis for halogen vice chlorine as required by ASME B&PV Code Section V Article 6. FNP-0-NDE-100.5 Revision 1, TCN 1B corrected this discrepancy.

These documents were well written and appropriate for their intended application.

c. Observation of Work and Work Activities, Unit 1

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

Activities ObservedLiquid Penetrant Examination (PT)

The inspector observed/reviewed records for the PT examinations of the welds listed below. The observations were compared with the applicable procedures and the Code. The inspector performed an independent evaluation of the indications obtained, to confirm the PT examiner's evaluation. Welds marked (†) were examined by document review.

Liquid Penetrant (PT) Examinations Observed

Code Cat./Item	Drawing/Weld No.	System
C-A/C1.10	ALA2-3540-1	Letdown Reheat Heat Exchanger
C-A/C1.20	ALA2-3540-2	Letdown Reheat Heat Exchanger
†C-F1/C5.11	ALA2-4506-6	Residual Heat Removal

Liquid Penetrant (PT) Examinations Observed

Code Cat./Item	Drawing/Weld No.	System
†C-F1/C5.11	ALA2-4506-10	Residual Heat Removal
†C-F1/C5.11	ALA2-4506-11	Residual Heat Removal
†C-F1/C5.11	ALA2-4506-12	Residual Heat Removal
†C-F1/C5.11	ALA2-4513-2	Chemical and Volume Control
†C-F1/C5.11	ALA2-4513-21	Chemical and Volume Control
†C-F1/C5.11	ALA2-4513-22	Chemical and Volume Control

- Relative to the examination of C-A/C1.10 and C-A/C1.20, the inspector noted the following: the drawing (APR2-3540 ISO A-351192 sheet 86) provided the ISI PT examiner, for the examination of channel head welds in the Unit 1 Letdown Reheat Heat Exchanger, did not provide direct traceability to that heat exchanger. The drawing identified the heat exchanger by the P&ID tag number and its noun nomenclature (Letdown Reheat Heat Exchanger) only, neither of which were found on the heat exchanger in the field. The inspector verified that the PT examination was conducted on the proper heat exchanger with the aid of the P&ID.

The examinations were performed satisfactorily.

The inspector reviewed the certification documentation for the PT cleaner, developer and penetrant (See Table 1 below).

The inspector reviewed the certification, qualification, and visual acuity documentation for the PT examiners (See Table 2 below).

Magnetic Particle Examination (MT)

The inspector observed/reviewed records for the MT examinations of the welds listed below. The observations were compared with the applicable procedures and the Code. Welds marked (†) were examined by document review.

Magnetic Particle (MT) Examinations Observed

Code Cat./Item	Drawing/Weld No.	System
†C-B/2C.21	ALA2-3300-7	Steam Generator
†C-F2/AUG/C5.21	ALA2-4301-9	Main Steam
†C-F2/C5.22	ALA2-4301-2L1	Main Steam
†C-F2/C5.22	ALA2-4301-2L2	Main Steam
†C-F2/C5.11	ALA2-4301-34	Main Steam
†C-F2/C5.21	ALA2-4301-2	Main Steam

The examinations were performed satisfactorily.

The inspector reviewed the certification documentation for the yoke and the 10 Lbs. test weight (See Table 1 below).

The inspector reviewed the certification, qualification, and visual acuity documentation for the MT examiners (See Table 2 below).

Ultrasonic Examination (UT)

The inspector observed/reviewed records for the UT examinations of the welds listed below. The observations were compared with the applicable procedures and the Code. The inspector performed an independent evaluation of the indications obtained, to confirm the UT examiner's evaluation. Welds marked (†) were examined by document review.

Ultrasonic (UT) Examinations Observed

Code Cat./Item	Drawing/Weld No.	System
C-F2/AUG/C5.21	ALA2-4301-7L1	Main Steam
C-F2/AUG/C5.21	ALA2-4301-8L1	Main Steam
C-F2/AUG/C5.21	ALA2-4301-7	Main Steam
C-F2/AUG/C5.21	ALA2-4301-6L1	Main Steam
C-F2/AUG/C5.21	ALA2-4301-6	Main Steam
†C-B/2C.21	ALA2-3300-7	Steam Generator
†C-F2/AUG/C5.21	ALA2-4301-9	Main Steam
†C-F2/AUG/C5.21	ALA2-4301-9	Main Steam

The examinations were performed satisfactorily.

The inspector reviewed the certification documentation for the UT instruments, transducers, and couplant (See Table 1 below).

The inspector reviewed the certification, qualification, and visual acuity documentation for the UT examiners (See Table 2 below).

Visual Examination (VT)

The inspector observed/reviewed records for the VT examinations of the components listed below. The observations were compared with the applicable procedures and the Code. Components marked (†) were examined by document review.

Visual (VT) Examinations Observed

Code Cat./Icem	Drawing No.	System
†B-D/B3.140	ALA1-3300-IR2	Steam Generator
†B-D/B3.140	ALA1-3300-IR1	Steam Generator
†B-G-2/B7.60	ALA1-5300-B26	Reactor Coolant Pump
†B-G-2/B7.60	ALA1-5300-B27	Reactor Coolant Pump
†B-G-2/B7.60	ALA1-5300-B25	Reactor Coolant Pump
†C-F2/AUG/C5.21	ALA2-4301-9	Main Steam

The examinations were performed satisfactorily.

The inspector reviewed the certification, qualification, and visual acuity documentation for the VT examiners (See Table 2 below).

Eddy Current Testing (ET) Steam Generator (S/G) Tubing

The licensee is performing the following ET examinations:

- 100% bobbin coil examination (tube sheet to tube sheet) of the non-plugged tubes where possible in all three S/Gs. Exceptions are sleeved tubes and row 1 and 2 U-bends.
- 100% 720 bobbin to bottom of sleeves.

- 620 Rotating Pancake (RPC) examination of all Tube Support Plate (TSP) intersections.
- 100% RPC examination of Top of Tubesheet (TOT) \pm 3 inches for all non-tubesheet sleeved tubes on the hot legs and 20% on the cold legs.
- 100% RPC examination of all TSP indications greater than 1.5 volts in S/G "C" and 2 volts in S/G "A" & "B".
- Augmented RPC examination of TSP indications in hot and cold legs, ie. dents over 5 volts and large residuals.
- RPC examination of any other straight length defective tube indications.
- 100% Cecco 5 probe inspection of all sleeves.
- RPC of row 1 and 2 tubes in S/G "A", "B" and "C".

The inspector observed plug removal and ET data acquisition activities. The observations were compared with the applicable procedures and the Code. The primary analysis was being conducted by W with the secondary analysis being conducted by Rock Ridge. The inspector verified that all personnel observed conducting work activities on the S/Gs were properly qualified and approved by the licensee.

The examinations were performed satisfactorily.

As requested by the Senior Resident Inspector, the inspector examined the following items in the licensee's commitment tracking system:

Item No **CMT# 9945** identified ten of the remaining 47 Inconel Alloy 600 S/G tube plugs to be removed during the fall 1995 outage. The licensee informed the inspector that they intended to replace all of the 47 remaining Inconel Alloy 600 plugs this outage. The inspector observed removal activities associated with the last of the 47 plugs. Following the programs in place, the licensee will adequately address this commitment.

Item No **CMT# 9977** identified S/G tube support voltage-based repair criteria commitments contained in Unit 1 Technical Specification change package for Unit 1, to be implemented for refueling outage 13. The inspector observed data acquisition and reviewed the licensee's data analysis program implementing the voltage based alternate plugging criteria. The inspector observed setup activities associated with pulling a tube from S/G "B" for metallurgical evaluation. Following the programs in place, the licensee will adequately address this commitment.

Table 1
NDE Equipment and Consumables Records Examined

Equipment/Consumables	Serial No/ Heat No./ Lot No./ Batch No.
PT Cleaner	94B03P
PT Developer	95B07K and 95D07K
PT Penetrant	94M05K and 95C03K
MT Powder	86M057 No. 8A Red
MT 10 LBS. Test Weight	W10363
MT Yoke	A999048 and W04670,
UT Reference Blocks	CS Rompas 788203
UT Instruments	136-472F, 136-774F, 136-896K, 136-897K, and 136-910K
UT Transducers	42898, B07655, F10379, and H30046
UT Couplant	094243 and 9091
ET MIZ-18 Remote Data Acquisition Units (RDAU)	W02877, W04515, W04468, W05052 and W0451
Thermometers	10019, 2269, and 2278
ET Calibration Standards	AB-003-85, AB-004-92, AB-005- 92, AB-008-91, AB-013-93, AV- 003-93, AV-008-88, S-019-94, S-020-95 and W02878

Table 2
Qualification, Certification, and Visual Acuity Records
Examined

Examiner	Method-Level			
JEA	UT-II	MT-II	PT-III	
DRC	UT-III	MT-III	PT-III	VT1,2,3-III
ELMc	UT-III	MT-III	PT-III	VT1,2,3-III
TAS	UT-III	MT-III	PT-III	VT1,2,3-II
PSB	UT-II	MT-II	PT-II	VT1-II
JLD	UT-II		PT-I	
RRS	UT-II	MT-II	PT-II	VT1,2,3-II
HMA	UT-I	MT-II	PT-II	VT1,2,3-II

Table 2
Qualification, Certification, and Visual Acuity Records
Examined

Examiner	Method-Level			
JWB	UT-TNG	MT-TNG	PT-TNG	VT1,2,3-II
JDF	UT-II	MT-II	PT-II	VT1,2,3-II
AWM	UT-II	MT-II	PT-II	
GAM	UT-II	MT-II	PT-II	VT1,2,3-II
TAB				ET-III
DEC				ET-III
PJD				ET-IIA
JWE				ET-IIA
TAG				ET-II
MJG				ET-II
OLH				ET-II
WWH				ET-TNG
JIH				ET-II
NEL				ET-II
PJM				ET-II
GWT				ET-II

The licensee has implemented IDDEAL® (Integrated Data, Drawing, Examination and A-Cadd Link), inspection data management computer software, to manage and track ISI data. An evaluation of IDDEAL® can be found in NRC Inspection Report 50-387/95-09 for the Sequehanna plant. It appears that the use of inspection data management computer software system should enhance efficiency of data storage, retrieval, tracking, and auditing.

ISI examinations were examinations were satisfactorily conducted by properly qualified personnel in accordance with appropriate procedures. Records reflected the accomplishment of examinations in accordance with procedural requirements and regulatory commitments.

Within the areas examined, no violations or deviations were identified.

3. Flow Accelerated Corrosion (FAC) (49001)

The licensee has established a FAC inspection program which implements the CHECWORKS® EPRI (Electric Power Research Institute) computer code,

industry experience, and previous inspection data as predictive tools for determining and prioritizing inspection locations. The inspector conducted interviews with licensee and contractor personnel and reviewed records as indicated below.

Observations/Findings

During RFO 13, the licensee planned to examine 57 locations in their FAC program, of which 31 have been previously examined. The sample population was expanded to 61. There are approximately 4,400 inspection locations identified in the Farley FAC Program for each Unit. To date approximately 300 locations in each Unit have been examined at least once. The licensee has replaced one elbow this outage. Detection and replacement were accomplished prior to reaching the minimum wall thickness.

The licensee instituted a Morpholine based secondary water chemistry in Unit 1 on December 12, 1987 and November 3, 1988 for Unit 2. The initiation of elevated hydrozine levels (greater than 20 ppb to greater than 100 ppb) was implemented for both Units February 2, 1993. The initiation of ETA (Ethanolamine) and the cessation of Morpholine occurred September 14, 1993 and December 1, 1993, for Units 1 and 2 respectively. The licensee's tests have shown that ETA at 1 ppm, hydrozine above 100 ppb and pH_{25} of 9.7 to 10.0 minimizes iron transport from the secondary systems to the S/Gs. This secondary water chemistry is consistent with the recommendations of EPRI TR-102134, Revision 3, PWR Secondary Water Chemistry Guidelines.

The inspector reviewed the Wall Thickness Engineering Evaluations made during Unit 1 RFO 13 for the below listed components.

Wall Thickness Engineering Evaluations Examined

Inspection Point Identification	Component Type	System	Disposition
1-94-3	3" Heater Connection and Elbow	Heater 2B Continuous Vent	Replaced
1-232-5	1.5" 45° Pipe Bend	Gland Seal Steam	Continue in service re-inspect during R016
1-13-30	20" Straight Pipe	Heater 5A Extraction	Continue in service re-inspect during R016
1-13-12	20" Elbow	Heater 5A Extraction	Continue in service re-inspect during R015
1-13-8	24" Elbow	Heater 5A Extraction	Continue in service re-inspect during R018

Wall Thickness Engineering Evaluations Examined

Inspection Point Identification	Component Type	System	Disposition
1-16-4	4" Tank Connection	MSR 2B Shell Drain Tank Vent	Continue in service re-inspect during R015
1-89-9	3" Heater Connection	Heater 2A Continuous Vent	Continue in service re-inspect during R017

The inspector reviewed FAC procedure, FNP-0-100.36, Revision 2, dated June 2, 1995, Ultrasonic Flow Accelerated Corrosion (FAC) examination Procedure and noted the following:

- The origin of examination grids are not required to be permanently marked (stamped) on the components to maintain continuity for subsequent examinations. The program depends on painted markings and location descriptions (i.e. top dead center) to locate the grid origin for subsequent examinations. If the painted markings are lost, then a potential error could be introduced in point to point data comparison with subsequent examination data.
- Procedure FNP-0-100.36 permits examination through coatings without any compensation taken in the wear calculations, for the thickness of the coatings. It should be noted however, the only coated component examined during this outage was subsequently replaced due to excessive wear that approached the minimum wall thickness.

The licensee has established and continues to implement an effective program to maintain high energy carbon steel piping systems within acceptable wall thickness limits.

Within the areas examined, no violations or deviations were identified.

4. Turbine Building Cooler Piping

The replacement non safety-related Turbine Building coolers are being installed by Trane. Trane subcontracted the welding to R. N. Pyle Contractors. The applicable code for the Turbine Building cooler pipe welding is AISC B31.1. The inspection requirements for the pipe welding is post weld pressure test in accordance with the Trane manual Section 5.2 dated August 1994.

The inspector reviewed the applicable Welding Procedure Specifications, associated Procedure Qualification Records, and Section 5.2 of the Trane Manual. The inspector visually examined approximately ten completed pipe welds.

The Welding Procedure Specifications were appropriate to the circumstances and properly qualified. The completed welds were visually acceptable to the requirements of AISC B31.1. Post weld pressure testing in accordance with Section 5.2 of the Trane Manual will provide adequate assurance of weld soundness for the service intended.

5. Exit Interview

The inspection scope and results were summarized on October 12, 1995, with those persons indicated in paragraph 1. The inspector described the areas inspected. Although reviewed during this inspection, proprietary information is not contained in this report. No dissenting comments were received from the licensee.

6. Acronyms and Initialisms

ASME	-	American Society of Mechanical Engineers
B&PV	-	Boiler and Pressure Vessel
CHECWORKS	-	Chexal Horowitz Engineering Corrosion WorkStation
EPRI	-	Electric Power Research Institute
ET	-	Eddy Current
FAC	-	Flow Accelerated Corrosion
ID	-	Identification
IDDEAL	-	Integrated Data, Drawing, Examination and A-Cadd Link
ISI	-	Inservice Inspection
MT	-	Magnetic Particle
NDE	-	Nondestructive Examination
No.	-	Number
NPF	-	Nuclear Power Facility
NRC	-	Nuclear Regulatory Commission
P.E	-	Professional Engineer
P&ID	-	Piping and Instrumentation Drawing
PT	-	Liquid Penetrant
QA	-	Quality Assurance
RDAU	-	Remote Data Acquisition Unit
Rev.	-	Revision
RFO	-	Refueling Outage
RPC	-	Rotating Pancake Coil
S/G	-	Steam Generator
SNC	-	Southern Nuclear Operation Company
TCN	-	Temporary Change Notice
TOT	-	Top of Tubesheet
TSP	-	Tube Support Plate
UT	-	Ultrasonic
<u>W</u>	-	Westinghouse