



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

Report Nos.: 50-250/93-11 and 50-251/93-11

Licensee: Florida Power and Light Company
 9250 West Flagler Street
 Miami, FL 33102

Docket Nos.: 50-250 and 50-251

License Nos.: DPR-31 and DPR-41

Facility Name: Turkey Point 3 and 4

Inspection Conducted: April 28-30, 1993

Inspector:

[Signature]
 W. S. Kleinsorge P.E.
 Reactor Inspector

May 3, 1993
 Date Signed

Approved by:

[Signature]
 J. J. Blake, Chief
 Materials and Process Section
 Engineering Branch
 Division of Reactor Safety

5/7/93
 Date Signed

SUMMARY

Scope:

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

Results:

In each of the areas examined, the inspector discovered that nondestructive test (NDE) examiners have conducted conservative examinations in accordance with the appropriate test procedures. NDE procedures were also noted to be very detailed, well organized and technically effective in implementing the applicable code requirements. Supervisors, engineers, and NDE examiners contacted during this inspection were very knowledgeable in their areas of responsibility. With the exception of a few minor discrepancies, ISI records reflect the accomplishment of ISI activities consistent with procedural and regulatory requirements. The licensee FAC program continues 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

Licensee Employees

- *T. Abbatiello, Site Quality Manager
- *G. Alexander, Supervisor Inspections ESI
- M. Blew, ISI Coordinator
- F. Carr, ISI Level III
- *R. Kundaikar, Engineering Manager
- *L. Motley, Supervisor Code Programs ESI
- *C. Mowrey, Licensing
- *L. Pearce, Plant General Manager
- *R. Turner, ISI Specialist
- *E. Weinkam, Licensing Manager

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

NRC Resident Inspectors

- *R. Butcher, Senior Resident Inspector (SRI)
- *L. Trocine, Resident Inspector (RI)

*Attended exit interview

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

2. Inservice Inspection (ISI)

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 Units 3 and 4 is the ASME B&PV Code, Section XI, 1980 Edition with Addenda through Winter 1981 (80W81). Unit 3 is operating in the third 40 month period of the second ten year interval (P3,I2) ending February 21, 1994. Unit 4 is in refueling outage (RFO) 14, the second and last outage of the third 40 month period, of the second ten year interval (O2,P3,I2) ending April 14, 1994. Unit 3 received its Operating License July 19, 1972, and commenced commercial operations on December 14, 1972. Unit 4 received its Operating License on April 10, 1973, and commenced commercial operations on September 7, 1973. The licensee's nondestructive examination (NDE) personnel, augmented by contract personnel from EBASCO, are performing liquid penetrant (PT), magnetic particle (MT), visual (VT), radiographic (RT), and ultrasonic (UT) examinations. Steam Generator (S/G) tubing eddy current (ET) examination data acquisition and analysis is being accomplished by the licensee's nondestructive examination personnel, augmented by contract personnel from Assea Brown Boveri Combustion Engineering (ABBCE), Zetec, Master-Lee (M-L), and Allen Nuclear Associates Inc. (ANA). All the above activities are being accomplished under the umbrella of the FP&L Quality Assurance (QA) Program.



a. ISI Program Review, Units 3 and 4 (73051)

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. Procedures were also reviewed for technical content.

Procedures Reviewed

ID	Revision	Title
ESI-ET-93-02	1/29/93	April 1993 Examination Plan for Steam Generator Tubing at Turkey Point Unit 4

b. Review of NDE Procedures, Units 3 and 4 (73052)

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.

Procedures Reviewed

ID	Revision	Title
FP&L NDE 1.3	(R5)	Eddy Current Examinations of Non-Ferromagnetic Tubing with Multi-Frequency Techniques MIZ-18
FP&L	(9/92)	ECT Data Analysis Guideline and Performance Demonstration
FP&L NDE 3.3	(R4)	Liquid Penetrant Examination Solvent Removable Viable Dye Technique
FP&L NDE 5.15	(R3)	Ultrasonic Examination of Reactor Coolant Pump Flywheels
FP&L NDE 5.16	(R4)	Ultrasonic Examination Technique for The Evaluation of Cracking in Feedwater Piping
FP&L TS 9.3	(R1)	Radiographic Inspection

Procedures were well written and appropriate for their intended application.



c. Observation of Work and Work Activities, Unit 3 (73753)

The inspector observed active work activities and reviewed records of 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 reviews conducted by the inspector are documented below.

Work Activities Observed

The inspector observed the UT examination of 4-LDHX-2 (Excess Letdown Heat Exchanger) head to flange weld, including the calibration activities.

The inspector observed the MT examination of integral attachment weld 178102B-H-422-031A on Steam Generator Blowdown piping. The inspector performed an independent evaluation of the indications obtained to confirm the NDE examiner's evaluation.

The inspector observed the PT examination of 8" SI-2408 weld Nos. 16, 17, and 18 in the Safety Injection system. The inspector performed an independent evaluation of the indications obtained to confirm the NDE examiner's evaluation.

The inspector independently examined eight studs and sixteen nuts on flange connection 2"-CH-1405-FBI in the Chemical and Volume Control system, to evaluate the indications obtained and to confirm the NDE examiner's evaluation.

The licensee RT examined nozzle to safe end weld RC-1406-1A in vice of UT, because of UT access limitations. The inspector reviewed the radiographs for film quality and acceptability. The radiographs are acceptable to ASME B&PV Code section III Division 1. The inspector noted the following related to the RT examination:

- The licensee's ISI program does not address the implementation of RT as a volumetric examination method. The licensee indicated that they would take appropriate actions to address this matter.
- FP&L Procedure TS 9.3, Revision 1, "Radiographic Inspection" dated February 2, 1984, contains acceptance criteria in the form of graphical representations of indications. Because of the age of the procedure and the number of times the procedure has been reproduced, artifacts (black spots) have appeared on the pages containing graphical representations of indications and potentially added to the number of acceptable indications in the acceptance criteria (thus reducing the rigorousness of the acceptance criteria). It should be noted that this issue does not reflect on the acceptability of weld No. RC-1406-1A.



The licensee indicated that they would take appropriate actions to address this matter.

The inspector observed ET data acquisition and analysis activities.

The licensee performed a 100% bobbin coil examination of the non-plugged tubes in all three generators. Rotating Pancake Coil (RPC) examinations were performed on 242 tubes at the top of the tube sheet for over expansion characterization in the "C" S/G, and one tube each, in the "C" hot and cold legs, were RPC examined for flaw characterization.

No tubes were plugged in any of the three generators as indicated below.

Steam Generator Tube Plug Summary U4

	S/G "A"	S/G "B"	S/G "C"
Tubes Previously Plugged	16	8	9
Tubes Preventively Plugged RFO 14	0	0	0
Tubes Plugged RFO 14 $\geq 40\%$	0	0	0
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Total Tubes Plugged	16	8	9
Degraded Tubes RFO 14 (20-39%)	2	8	9
Total Tubes Examined	3198	3206	3205

The examinations were performed properly in accordance with regulatory and procedural requirements.

PT Examination Records Reviewed

PT reports reviewed: 3.3-1 to 3.3-23

Relative to the PT examinations, the inspector reviewed certification documentation for the following PT materials (penetrant cleaner and developer), and thermometers. Relative to the examination of PT records the inspector noted the following:

Penetrant Materials

Penetrant: 92A05P
 Cleaner/Remover: 92E10K, 92J01K, 93C01P
 Developer: 91B02P

Thermometers

S/N: 93-018, 93-016, 93-011, 93-002

The inspector reviewed qualification, certification and visual acuity documentation for the following PT examiners.

PT Examiners

BB PT-IT	PMV PT-II	SPC PT-II	BJF PT-II
WH PT-II	WWM PT-II	RM PT-II	DRR PT-II
MDR PT-III	RBS PT-I		

- Level I PT examiner JV, appears on a number of PT examination reports. The licensee has no PT level I certification for this individual. It should be noted that on each record that JV was indicated, those records also indicate a properly certified Level II PT examiner. Therefore there is no question as to the validity of the PT examinations. The licensee indicated that they would take appropriate actions to address this matter.

MT Examination Records Reviewed

MT reports reviewed: 2.2-1 to 2.2-3

Relative to the MT examinations, the inspector reviewed certification documentation for the following MT Yokes, dry powder, and ten Lbs. test weights. Relative to the examination of MT records, the inspector noted the following:

- There was some confusion in the identification of the ten Lbs. test weight on the MT reports. The licensee indicated that they would take appropriate actions to address this matter.

Yokes

ELO 110 S/N FPL MT-4 B310 S/N 205

Dry Powder

Magnaflux 8A Red Batch No.91E057

Ten Lbs. Test Weights

.14B

The inspector reviewed qualification, certification and visual acuity documentation for the following MT examiners.

MT Examiners

SPC MT-II DMG MT-II WH MT-II

VT Examination Records Reviewed

VT reports examined: 4.1-3
4.3-1 to 4.3-26
4.3-28 to 4.3-68
4.4-1 to 4.4-3

Relative to the VT examinations the inspector reviewed qualification, certification and visual acuity documentation for the following VT examiners.

VT Examiners

DRR VT1-II, UT3&4-II MDR VT1-III, VT3-III

UT Examination Records Reviewed

UT reports examined: 5.1-1 and 5.4-1

Relative to the UT examinations the inspector reviewed certification documentation for the following UT calibration blocks, UT instruments, and complement. Relative to the examination of UT records the inspector noted the following:

- The method of identifying UT instrument serial numbers and model numbers was not consistent.

UT Calibration Blocks

UT-7, UT-27, UT-41

UT Instruments

S/N: 27276-1078, 136-700I, 136-301-D

Couplant

Ultragel II batch No. 93001

The inspector reviewed qualification certification and visual acuity documentation for the following UT examiners.

UT Examiners

SPC UT-II DMG UT-I WH UT-II MDR UT-III
JV UT-I

ET Examination Records Examined

The inspector reviewed selected data acquired for all three generators. The inspector reviewed certification documentation for the following Remote Data Acquisition Units (RDAUs), and calibration standards.

RDAU Certifications Examined

S/N: 060, 066, 094, 201, and 202

Calibration Standard Certifications Examined

S/N: Z-1546, Z-1544, Z-3455, Z-10445, Z-10447, and AV-Z-5762

The inspector reviewed qualification certification and visual acuity documentation for the following ET examiners.

ET Examiners

FP&L

GTB ET-IIA WKH ET-III DAL ET-IIA AM ET-IIA

ABBCE

AP ET-IIA AWA ET-I GSB ET-III END ET-II
RLD ET-II ERE ET-IIA HGE ET-II JAF ET-IIA
DPF ET-IIA JFJ ET-IIA HL ET-III PKL ET-I
RSM ET-III MS ET-IIA TS ET-IIA

M-L

LAA ET-II SWF ET-I LTP ET-IIA SDS ET-I



ANA

GDD ET-II MAJ ET-II DDM ER-I RAS ET-II
 WMW ET-IIIA

Zetec

PAA ET-IIIA DJC ET-IIIA WAG ET-IIIA DHI ET-IIIA
 RAN ET-IIIA CDS ET-IIIA

Relative to ISI records for all methods, the inspector noted a number of examples where corrections were initialed but not dated contrary to FP&L's procedural requirements. The inspector observed the author affect corrections.

Augmented S/G Feedwater piping inspections

As a result of NRC Bulletin 79-13, the licensee UT examines the 18" S/G Feedwater nozzle-to-reducer welds of each S/G at each refueling outage. Late in the day, Thursday, April 29, 1993, the licensee notified the inspector that they identified circumferential linear indications in all the S/G Feedwater nozzle-to-18"x14"reducer welds. The cracks were determined to be emanating from the counterbore-to-taper transition in the reducers, propagating into the nozzle base material from the pipe inside diameter. The licensee characterized the indications as follows:

S/G	Maximum Through Wall	Maximum Indication Length	Characterization
A	80%	12"	Large Indication Top, Intermittent Indications 360°
B	70%	20"	Large Indication Top, Intermittent Indications 360°
C	60%	Not reported	Intermittent Indications 360°

At the time of the inspection, the UT data was not available for NRC review. The licensee informed the inspector that they intended to replace all three 18" x 14" reducers during this outage, and that they expected work to begin approximately May 7, 1993.

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 CHECMATE® 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 procedures indicated below.

Procedures Reviewed

ID	Revision	Title
JPN-ESI-E/C-100	(R0)	Corporate Long-Term Erosion/Corrosion Monitoring Program

Observations/Findings

During RFO 14, the licensee planned to examine 115 components in their FAC program. At this writing the licensee has identified 23 components for replacement: 19 planned from previous outage examinations and nine as a result of examinations this outage. The sample has now expanded to 138 components, and examination continues.

To date, the licensee has not used the T-Dat portion of the CHECMATE® program and therefore has missed out on the iterative benefits built into the program. T-Dat has now been incorporated in the corporate program to be implemented on a case by case basis. The licensee indicated that they would start implementing T-Dat with the Unit 4 RFO 14 data.

The calculations used in the FAC program had not been proceduralized. The calculations are now incorporated in the corporate program.

The remaining life of components was not calculated in the past. This calculation if done would have provide an effective means to schedule reinspection of components to achieve maximized results. Remaining life calculations are included in the corporate program, but to date there is no mechanism established to track the data to make it useful.

Notwithstanding the above the licensee has established an apparently 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. Exit Interview

The inspection scope and results were summarized on April 30, 1993, 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. Dissenting comments were not received from the licensee.

5. Acronyms and Initialisms

ABBCE	-	Assea Brown Boveri Combustion Engineering
ANA	-	Allen Nuclear Associates Inc.
ASME	-	American Society of Mechanical Engineers
B&PV	-	Boiler and Pressure Vessel
DPR	-	Demonstration Power Reactor
ET	-	Eddy Current
EPRI	-	Electric Power Research Institute
FAC	-	Flow Accelerated Corrosion
FP&L	-	Florida Power and Light
ID	-	Identification
ISI	-	Inservice Inspection
M-L	-	Master-Lee
MT	-	Magnetic Particle
NDE	-	Nondestructive Examination
No.	-	Number
NRC	-	Nuclear Regulatory Commission
P.E.	-	Professional Engineer
PT	-	Liquid Penetrant
QA	-	Quality Assurance
R	-	Revision
RDAU	-	Remote Data Acquisition Unit
RFO	-	Refueling Outage
RI	-	Resident Inspector
RPC	-	Rotating Pancake Coil
RT	-	Radiography
S/G	-	Steam Generator
SRI	-	Senior Resident Inspector
UT	-	Ultrasonic
VT	-	Visual