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

Report Nos.: 50-335/90-26 and 50-389/90-26

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

Docket Nos.: 50-335 and 50-389 License Nos.: DPR-67 and NPF-16

Facility Name: St. Lucie 1 and 2

Inspection Conducted: October 22-26, 1990

Inspectors: _____ October 30, 1990
W. P. Weinsorge P.E. Date Signed

Approved by: _____ 10/31/90
J. J. Blake, Chief Date Signed
Materials and Processes Section
Engineering Branch
Division of Reactor Safety

SUMMARY

Scope:

This routine, unannounced inspection was conducted onsite in the areas of Inservice Inspection (ISI) including a review of the Unit 1 ISI plan for this outage and associated ISI administrative procedures; review of Nondestructive Examination (NDE) procedures; observations of Unit 2 in-progress Ultrasonic (UT), Magnetic Particle (MT), and Liquid Penetrant (PT) examinations and associated activities and, review of completed NDE examination results data. In addition the following areas were examined: Followup on Generic Letter 90-05 "Guidance for Performing Temporary Non-Code Repair of ASME Code Class 1, 2 and 3 Piping," and Followup on NRC Bulletin 87-02 "Fastener Testing To Determine Conformance With Applicable Material Specifications."

Results:

The Review of the licensee's Inservice Inspection (ISI) program indicates adequate management and control, of the program, is currently in place. The personnel implementing the program, and performing the examinations, were well trained and well qualified. The inspector noted a weakness related to weld area of interest identification (Paragraph 2.e.(2))

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*G. Alexander, Plant Support/Juno Beach Staff (NS/JB)
*J. Barrow, Operations Superintendent
*G. Boissy, Plant Manager
*F. Carr, NS/JB Staff
S. Collard, NS/JB Staff
*D. Culpepper,Engineering Supervisor
*R. Englmeier, Site Quality Manager
*J. Geiger, Vice President Nuclear Assurance
*D. Lowens, Quality Assurance (QA)
*L. McLaughlin, Technical Staff
*J. Moaba, JPN/ESI
*L. Motley, JPN/ESI Staff
*D. Nowakowski, NS/JB Staff
*B. Parks, Quality Assurance
*S. Sienkiewicz, Inservice Inspection Technical Staff
*D. Stewart, Technical Staff
*W. West, Technical Department Supervisor

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

NRC Resident Inspectors

*S. Elrod, Senior Resident Inspector
*M. Scott, Resident Inspector

*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 Unit 1, is the American Society of Mechanical Engineers Boiler and Pressure Vessel (ASME B&PV) Code, Section XI, 1983 edition with addenda through summer 1983

(83S83). Unit 1 is operating in the second 40 month period, of the second ten year ISI interval(P2,I2). Unit 1 commenced commercial operations on December 21, 1976. The applicable code for ISI for Unit 2 Unit is ASME B & PV code Section XI 80W80. Unit 2 commenced commercial operations on August 8, 1983. Unit 2 is in the first outage of the third 40 month period, of the first ten year ISI interval(O1,P3,I1). The licensee's nondestructive examination personnel, augmented by contract personnel from EBASCO, are performing the liquid penetrant (PT), magnetic particle (MT), visual (VT), and ultrasonic (UT) examinations. Steam generator tubing eddy current (EC) examination data collection is accomplished by Assea Brown Boveri Combustion Engineering (ABBCE) contracted personnel, with contracted ABBCE, Zetec and NDE Tech personnel and FP&L personnel performing the data analysis. All the above activities are being accomplished under the umbrella of the FP&L Quality Assurance (QA) Program.

a. ISI Program Review, Units 1 and 2 (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 (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.

JNS-PSL-200	(R5)	Inservice Inspection Plan First Ten Year Plan (Unit 2)
ESI-PSL-200-4	(R1)	First Interval/Third Period Inservice Examination Plan (Unit 2)
JNS-MCI QI 2.14	(R5)	Nuclear Energy Manual for ASME Section XI Inservice Inspection of Nuclear Power Plants

JNS-[illegible] QI 9.2	(R1)	Control of Nondestructive Examination (NDE) Activities
ADM-CIS-9.1	(R1)	Procedure For Qualification of Nondestructive Examination Procedure Calibration Blocks/Standards
CAL-3	(R1)	Calibration Verification of Temperature Measuring Devices

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

(1) 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 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.

NDE-1.3	(R3)	Eddy Current Examination of Non Ferromagnetic Tubing with Multi-Frequency Techniques MIZ-18
NDE-2.2	(R2 & FCA)	Magnetic Particle Examination
NDE-3.3	(R2)	Liquid Penetrant Examination Solvent Removable Viable Dye Technique
NDE-4.1	(R3)	Visual Examination VT-1 for Welds/Bolting/Bushings/Washers
NDE-4.2	(R1)	Visual Examination VT-2 Conducted During System Pressure Test
NDE-4.3	(R2)	Visual Examination VT-3/VT-4
NDE-5.5	(R2 & FCA)	Ultrasonic Examination of Main Coolant Main Piping Welds
NDE-5.7	(R2 & FCA)	Ultrasonic Examination of Reactor Pressure Vessel Studs and Reactor Coolant Pump Studs
NDE-5.12	(R2 & FCA)	Ultrasonic Examination of Reactor Pressure Vessel Flange to Vessel Weld and Stud Hole Threads
NDE-5.18	(R2)	Ultrasonic Thickness Measurement

The inspector reviewed the UT 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) Liquid Penetrant Examination (PT)

The inspector reviewed the PT 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) Magnetic Particle Examination (MT)

The inspector reviewed the MT 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) Visual Examination (VT)

The inspector reviewed the VT 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) Eddy Current Examination (EC)

The inspector reviewed the EC 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 2 (73753)

The inspector 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 inspector are documented below.

(1) Ultrasonic Examination (UT)

The inspector observed calibration activities and the in-process UT examinations as indicated below. 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.

Examinations Observed

The inspector observed in process UT examinations on the Main Steam (MS) system. The inspector reviewed documentation for UT examinations on the Reactor Pressure Vessel (RPV), Steam Generators (SGs) and the Safety Injection (SI) system

The inspector reviewed selected calibration and certification documentation for the UT instruments, calibration blocks, and couplant, and spectrum analysis data for the ultrasonic transducers used in the examinations listed above.

(2) Liquid Penetrant Examination (PT)

The inspector observed the in process PT examinations as indicated below. 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.

Examinations Observed

The inspector observed in process PT examinations on the Reactor Coolant (RC) system. The inspector reviewed records of PT examinations on the SI and Shut Down Cooling (SDC) systems.

The inspector re-evaluated the examinations observed in process following the PT examiner's evaluation of the area of interest but prior to the developer being removed from the surfaces. This re-evaluation was conducted in order to determine if the evaluations performed by the PT examiners were 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 inspector indicated that the proper evaluation was made by the PT examiners and that the examination results were being reported as required.

The inspector's review of the liquid penetrant materials certification records, for the examinations indicated above, that the sulfur and halogen content of the material was within acceptable content limits.

(3) Magnetic Particle Examination

The inspector observed the in-process MT examinations as indicated below. 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.

Examinations Observed

The inspector observed in process MT examinations on the RC system. The inspector reviewed records of MT examinations on the RPV, SGs, and the RC and MS systems.

The inspector conducted MT verification examinations, of the examinations observed in process, using the yoke equipment, on portions of those areas of interest previously observed being examined. 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 inspector reviewed documentation indicating that the 10 pound lift test had been performed on magnetic particle alternating current (AC) yokes observed above. The certification records for the lift test plates that were used to conduct the tests, were reviewed to confirm the weight of the test plates.

A review of the material certification records for the particles used in the examinations above met the applicable specifications requirements.

(4) Visual Examination (VT)

The inspector observed the below indicated in-process VT examinations. 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.

Examinations Observed

The inspector observed in process VT examinations on supports in the Component Cooling Water (CCW) system. The inspector reviewed records of VT examinations on the RPV, and Pressurizer, in addition the RC, SI, SDC, Feedwater, and Pressurizer Auxiliary Spray systems.

The inspector conducted independent examinations, on the in process examinations, indicated above, previously observed being examined. 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 visual examiners.

(5) Steam Generator Tubing Eddy Current Examination (EC)

The inspector observed the EC activities indicated below. The observations were compared with the applicable procedures and the ASME Code in the following areas: method for maximum sensitivity 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.

Activities Observed

The inspector examined records of the EC examinations of the SG tubing, as the window of opportunity had past for observation of in process examination activities.

Certification records for EC calibration standards were reviewed for material type, correct fabrication, and artificial flaw location and size.

(6) Personnel Qualification

The inspector reviewed personnel qualification documentation for the examiners indicated below. 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.

Examiner Records Examined

Method	Number
UT	3
PT	4
MT	4
EC	4

d. Data Review and Evaluation, Unit 1 (73755)

Records of completed ISI nondestructive examinations indicated below were selected and reviewed to ascertain whether: the method(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.

The inspector reviewed the completed ISI report for the second outage, first period, second interval (O2,P1,I2), for Unit 1.

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.

e. Observations

(1) As the result of EC examination of the steam generator tubes during the most recent outages, a total of 219 tubes were plugged on both units, as indicated below:

	SG 1A	SG 1B	SG 2A	SG 2B
Previously Plugged Tubes	603	456	221	162
Tubes Plugged 02,P1,I2 (U1)	126	54		
Tubes Plugged 01,P3,I1 (U2)			21	18
Total Tubes Plugged	729	510	242	180

(2) The inspector noted, while observing surface examinations on the Reactor Coolant system loop piping, that the welds observed were not well marked, causing the conscientious examiners to examine a significantly larger area than required by the code in order to assure complete coverage of the required area of interest. This lack of adequate markings extended the examiner's stay time in a radiation area.

(3) The following items are of relatively minor significance, but are indicative of lack of attention to detail.

- Relative to the review of procedures, the inspector noted that NDE 5.16, Rev.2, "Ultrasonic Thickness Measurement", paragraph 5.3, contains graphical representations of instrument controls with no identifying text. Due to the small size and complexity of graphical representations and the limitations of the reproduction process used to publish the procedure, the controls are not clearly identifiable.

- Relative to the review of records the inspector noted several examples where document entries were changed by over writing rather than an initialed and dated single line strike out. Other examples were noted where corrections were initialed but not dated. A number of pipe support drawings were noted with incorrect weld symbols (Example: Bergan-Paterson Pipesupport Corp. Drawing N. SIH-224, Rev.1-30-1973).

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

3. Followup on NRC Bulletin 87-02, "Fastener Testing To Determine Conformance With Applicable Material Specifications"

NRC Bulletin 87-02 requested licensees to test safety-related (SR) and nonsafety-related (NSR) fasteners. Supplements 1 and 2 to the Bulletin requested licensees to provide a list of suppliers and/or manufacturers from whom the fasteners may have been purchased. TI 2500/27 required an NRC inspector to evaluate the adequacy of certain licensees' root cause analysis and the implementation of corrective actions in response to NRC Bulletin 87-02.

The inspector assessed the areas identified in TI 2500/27 applicable to the St. Lucie plant, and determined that all three samples identified therein were NSR and had not been used in SR applications. This determination is based on interviews with licensee personnel, the licensees material control system and that control system's implementation as observed during the recent Maintenance Team Inspection conducted in the fall of 1989, at the St. Lucie site.

4. Followup on Generic Letter 90-05, "Guidance for Performing Temporary Non-Code Repair of ASME Code Class 1, 2 and 3 Piping."

The inspector discussed the implementation of Generic Letter 90-05 with the licensee who indicated that they had amended procedure QI 10-PR/PSL-8, Revision 1, "Control of Repairs and Replacements," to address the guidance of the Generic Letter. The licensee further indicated that their Engineering Department did not permit temporary non-code repairs, not withstanding they were well aware of the requirements of 10 CFR 50.55a(g)(6)(i).

5. Exit Interview

The inspection scope and results were summarized on October 26, 1990, 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.

6. Acronyms and Initialisms

ABBCE	-	Assea Brown Boveri Combustion Engineering
AC	-	Alternating Current
ASME	-	American Society of Mechanical Engineers
B&PV	-	Boiler and Pressure Vessel
B&W	-	Babcock and Wilcox
CFR	-	Code of Federal Regulations
DAC	-	Distance Amplitude Curve
DPR	-	Demonstration Power Reactor
EC	-	Eddy Current
FP&L	-	Florida Power & Light
ID	-	Identification
ISI	-	Inservice Inspection
MS	-	Main Steam
MT	-	Magnetic Particle
NDE	-	Nondestructive Examination
No.	-	Number
NPF	-	Nuclear Power Facility
NRC	-	Nuclear Regulatory Commission
NSR	-	NonSafety-Related
OD	-	Outside Diameter
P.E.	-	Professional Engineer
PT	-	Liquid Penetrant
QA	-	Quality Assurance
R	-	Revision
RC	-	Reactor Coolant
RPV	-	Reactor Pressure Vessel
RT	-	Radiographic Test
SDC	-	Shut Down Cooling
SG	-	Steam Generator
SI	-	Safety Injection
SR	-	Safety-Related
UT	-	Ultrasonic
VT	-	Visual