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

Report Nos.: 50-335/90-05 and 50-389/90-05

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: February 12-16, 1990

Inspector: J. L. Coley 3-6-90
J. L. Coley Date Signed

Approved by: J. J. Blake 3/6/90
J. J. Blake, Chief Date Signed
Materials and Processes Section
Engineering Branch
Division of Reactor Safety

SUMMARY

Scope:

This routine, unannounced inspection was conducted in the areas of inservice inspection (ISI) - observation of work and work activities (73753), review of previous inspection findings (92701) and independent inspection.

Results:

Walkdown inspections of the Unit 1 containment, auxiliary and turbine buildings revealed that this plant is well maintained. Vendor activities were effectively controlled and supported. The licensee was responsive to NRC concerns as demonstrated when the inspector reported a component cooling water hanger which appeared to have excessive gap between a retaining wall and the steel plate which anchored the hanger (paragraph 3.c.). Licensee corrective actions on previously reported inspector findings were effectively invoked.

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

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*G. P. Alexander, ISI Specialist
*J. H. Barrow, Superintendent Operations
*G. Boissy, Plant Manger
*B. Dawson, Superintendent, Maintenance
*J. B. Harper, Superintendent, Quality Assurance
*L. McLaughlin, Engineer, Licensing
*D. Nowakowski, Nondestructive Examination (NDE) Level III
*S. W. Sienkiewicz, ISI Coordinator
*D. Sipes, Services, Manager
*D. West, Technical Supervisor
G. Boyers, Eddy Current Coordinator
F. Carr, NDE Supervisor
D. Church, Eddy Current Coordinator
J. Pierce, Maintenance Engineer

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

Other Organizations

Southwest Research Institute:

H. Diaz, NDE Level III Examiner
R. Fougerousse, Project Engineer
R. Niemeyer, Field Supervisor

NRC Resident Inspectors

M. Scott, Resident Inspector

*Attended exit interview

2. Inservice Inspection - Observation of Work and Work Activities Unit 1 (73753)

The inspector observed ISI work and work activities to determine whether examinations performed on Classes 1, 2, and 3 pressure retaining components were conducted in accordance with technical specifications, the applicable ASME Code, correspondence between NRR and the licensee concerning relief requests, and requirements imposed by NRC/industry initiatives. The applicable Code for the Unit 1 ISI examinations was ASME Sections V and XI (83S83).

a. Volumetric examination of welds using the automatic ultrasonic technique

The inspector observed Southwest Research Institute (SwRI) conduct system calibrations and portions of examinations and data evaluations for the following welds:

Weld No.	Description
10-205A	Outlet Nozzle to Reactor Vessel Shell @ 0 Degrees
10-205B	Outlet Nozzle to Reactor Vessel Shell @ 180 Degrees
ON-IR-A	Inner Radius Outlet Nozzle @ 0 Degrees
ON-IR-B	Inner Radius Outlet Nozzle @ 180 Degrees
205.07A	Outlet Nozzle to Extension @ 0 Degrees 45° Scan
RC-114-FW-1-500G	Outlet Nozzle Extension to Pipe @ 0 Degrees 45° Scan
RC-114-500G-LS-A	Pipe Longitudinal Weld @ 0 Degrees
RC-114-500G-LS-B	Pipe Longitudinal Weld @ 0 Degrees
205-07-B	Outlet Nozzle to Extension @ 180 Degrees 45° Scan
RC-123-FW-1-500A	Outlet Nozzle Extension to Pipe @ 180 Degrees 45° Scan
RC-123-500A-LS-A	Pipe Longitudinal Weld @ 180 Degrees
RC-123-500A-LS-B	Pipe Longitudinal Weld @ 180 Degrees

The above examinations were conducted as follows:

(1) The outlet nozzle-to-shell welds were examined from the nozzle bore utilizing search units which produced 15 degree refracted longitudinal waves and 45 degree shear waves for the detection of reflectors in the weld and adjacent base material.

(2) The outlet nozzle inside radius section was examined from the nozzle bore utilizing 50/70 degree refracted longitudinal waves

to detect underclad cracking and flaws in the near-surface area between the tangent point and the point along the nozzle bore as defined by Section XI as the extent of the required examination area..

(3) The outlet nozzle-to-extension and extension-to-elbow and pipe longitudinal seam weld were examined with 45 degree shear waves for cracks on the outside surface area. A 0-degree search unit was utilized to monitor thickness readings and module contact.

(4) In addition to the above, the outlet nozzle-to-extension and extension-to-pipe and pipe longitudinal seam would also be examined from the nozzle/pipe bore with 50/70 degree refracted longitudinal waves to detect underclad cracking and flaws in the lower one-third area of the weld and adjacent base material. However, this examination was not conducted within the time limitations of this inspection.

SwRI procedures used to conduct the above examinations were reviewed by the inspector for technical content and compliance with the ASME Code. Certification records of SwRI examination personnel as well as certification and calibration records of ultrasonic equipment were also reviewed. The automatic system utilized by SwRI was a console of Sonic Mark II's for acquiring the ultrasonic data. The data was then fed into an enhanced data acquisition system (EDAS) for processing. A level III examiner would then take the recorded data and, with the aid of a computer drafting program, conduct the evaluations. SwRI examination personnel utilized for the above examinations were well qualified to perform their assigned task. The inspector observed the examiners on numerous occasions utilizing their procedures to ensure verbatim compliance during system calibrations and examination operations. Data evaluated for the above welds did not reveal any unacceptable indications.

b. Volumetric examination of welds using the manual (A-scan) ultrasonic techniques

The inspector observed Florida Power and Light (FP&L) Company NDE examiners performing the 45° and 60° ultrasonic examinations on the following steam generator 1-A welds:

Weld No.	Description	Area Examined	Procedure
SG-1A-3-104	Tubesheet to Extension Ring Weld	300° to 180°	NDE 5.1, R-5
SG-1A-7	Extension Ring to Lower-Shell Weld	300° to 180°	NDE 5.1, R-5

The inspector noted that the approved procedure was being followed and that the examination personnel were knowledgeable of the examination method and operation of the test equipment. No recordable relevant indications were noted during these examinations.

c. Surface examination of welds using the liquid penetrant technique

Liquid penetrant examinations of the following 12-inch safety injection welds were observed by the inspector:

Weld No.	Description	Pipe Configuration
SI-457-FW-1	Safety Injection Tank 1A2 Piping	Nozzle-to-Elbow
SI-457-1-SW-2	Safety Injection Tank 1A2 Piping	Pipe-to-Elbow
SI-457-1-SW-3	Safety Injection Tank 1A2 Piping	Elbow-to-Pipe
SI-458-FW-2	Safety Injection Tank 1A1	Nozzle-to-Elbow
SI-458-2SW-1	Safety Injection Tank 1A1 Piping	Elbow-to-Piping

The above examinations were conducted by MQS and Ebasco test examiners utilizing FP&L procedure no. NDE 3.3 R-2. The examinations methods and evaluation of the test results were in accordance with the approved procedure.

d. Volumetric examination of steam generator tubes using the eddy current technique

FP&L started the present Unit 1 outage several weeks early as a result of a small tube leak discovered in steam generator 1-B. The inspector discussed this tube failure, the degradation of adjacent tubes, the investigation for an apparent loose object, and the removal of Westinghouse nonconforming mechanical plugs with the FP&L lead steam generator coordinator. The tube in steam generator 1-B which was leaking was located on the periphery of the tube bundle at row 130, line 54. Eddy current examinations had determined wall lost on this tube as approximately 82%. Adjacent tubes on row 131, line 55, and row 129, line 55, exhibited 60% and 18% wall lost, respectively. Orientation of tube wear indicated a loose object was wedged between these tubes. However, visual examinations were unsuccessful in confirming this because they were limited by the camera's fixture and close clearances between the steam generator

shell and the tube bundle. The licensee plans to modify the fixture and attempt to confirm that a loose object is wedged between these tubes after sludge lancing is complete. FP&L, however, does not plan to pull a tube for verification or retrieval of the object if the second visual attempt between the steam generator shell and tube bundle is not successful. The reason for this decision is based on the fact that no other tube in the area has wall degradation. Review of previous eddy current data revealed some tube degradation on these three tubes during previous examinations indicating that if a loose object is in the steam generator it has been wedged in place and all three tubes which are affected will be plugged. Other repair activities in process on the steam generators consisted of Combustion Engineering removing the nonconforming Westinghouse tube plugs from the cold side of the steam generators. Plugs that had been installed in the hot side had been removed in the preceding outage.

In addition to the discussion held above, the inspector observed eddy current examinations (data collection) of tubes in the 1-B steam generator performed from the hot leg side, observed examiners performing analysis of the eddy current data, reviewed the applicable examination procedure, reviewed equipment calibration records and reviewed examiner qualification and certification records. Analysis of the eddy current data was performed by three independent groups made up of examiners from Zetec, NDE Technology, and Combustion Engineering. The eddy current examinations (data collection) were conducted by Combustion Engineering using Zetec's MIZ-18 Multi--frequency testers. All unplugged tubes in both generators were examined.

The following eddy current examinations conducted from the hot side of steam generator 1-B were observed by the inspector:

Row	Line
7	121
5	121
3	121
1	121
2	122
4	122
6	122
7	123
5	123
3	123
1	123
2	124
4	124
6	124

(cont'd)

Row	Line
7	125
5	125
3	125
1	125
2	126
4	126
6	126
7	127
5	127
3	127
1	127
2	128
4	128
6	128
7	129
5	129

Within the areas examined, violations or deviations were not identified.

3. Independent Inspection - Unit 1

During surveillance inspections of the Unit 1 containment, the auxiliary building, the turbine building and the component cooling water pump and heat exchanger area,; the inspector continuously observed work in progress, the condition of the plant equipment, housekeeping and how effectively work was being pursued by the licensee and their vendors.

This paragraph will address specific observations made by the inspector on safety-related equipment and/or safety significant equipment in the following areas of the plant.

a. Containment and Auxiliary Buildings - Housekeeping and protection of equipment was excellent. In-process work appeared to be staged effectively, NDE personnel were observed with the procedures needed to perform their task. FP&L was auditing work in progress and coordinating vendor efforts. Personnel appeared to be knowledgeable of their assigned responsibilities and eagerly pursuing them. High radiation areas were effectively identified and controlled. No equipment degradation was observed by the inspector.

b. Turbine Building - Work was observed being performed in a safe and orderly manner. Housekeeping, protection of equipment and staging was very good. The inspector audited three Level III NDE examiners performing thickness measurements on piping for the extraction steam in-accordance-with NRC Bulletin 87-01. The areas of examination were well gridded and the examiners conducted their examinations effectively. However, during the inspector surveillance of turbine work in the lay-down area between the Unit 1 and Unit 2 turbine

buildings, the inspector noted that pants-leg locking devices on a shaft for a refurbished multistage deep draft heater drain pump were incorrectly installed. Although this pump is considered non-nuclear, it is very important since it is a subsystem of the feed water system. The inspector's primary concern, however, was that the maintenance personnel that installed the locking devices incorrectly on non-nuclear equipment could also be the same personnel that would be used to install locking devices on nuclear equipment such as the main steam isolation valves. FP&L was notified of the discrepant condition and a maintenance engineer immediately verified the inspector's concern and assured the inspector that the ineffective locking devices would be removed. In addition, the maintenance engineer stated that the correct installation of locking devices on nuclear equipment would be verified by the licensee. Subsequent discussions with the NRC resident inspector revealed that the licensee has now correctly installed the locking devices on the multistage shaft for the heater drain pump. The resident inspector also stated that he would verify that the inspector's nuclear equipment concerns were effectively addressed by licensee.

c. Component Cooling Water Pump and Heat Exchanger Area - During the inspector's surveillance of the trench area for the Component Cooling water pumps, the inspector observed a hanger that was attached to a steel plate and bolted to the west end of the concrete center dividing wall. This hanger had clearances between the wall and the steel plate that appeared excessive. The inspector contacted the ISI Coordinator to determine the procedural clearance requirements and to determine whether this hanger was in the ISI program for examination of hanger degradation. Subsequent discussions with the ISI Coordinator revealed the hanger was in the ISI program but was not scheduled for examination this outage. The ISI Coordinator stated, however, that the hanger would be put in this outage inspection plan and a nonconformance report would address the inspector's concern. Primarily, investigation performed by the licensee indicated, however, that the load on the end of the hanger that has the gap would have been compressive and therefore the gap was probably due to irregularities in the concrete wall.

Within the areas examined, violations or deviations were not identified. The licensee actions on concerns addressed by the inspector were responsive and effective.

4. Licensee Actions on Previous Inspector Findings (92701)

(Closed) Inspector Follow-up Item 50-335/89-05-01, Update Zetec QA Procedures Z-QA-101, Rev. 6, to the Latest Revision

An inspector had previously noted that procedure Z-QA-101 Revision 6 in the Zetec QA Manual required Zetec employees to submit to a psychological

examination once every ten years. Contrary to this requirement, the inspector noted that 1975 was indicated as the last dated when one of the examiners had submitted to a psychological test. This discrepancy was communicated to the licensee who contacted Zetec for an explanation. Zetec informed the licensee that the subject procedure had been revised and the psychological examination is now performed only at the time of employment. The licensee stated that Zetec was sending a copy of the revised procedure for incorporation in Zetec's QA Manual on file. During this inspection, Revision 8 to Zetec's Procedure No. Z-QA-101 was reviewed by the inspector. As stated by Zetec, paragraph 3.A. has eliminated the requirement for psychological screening every ten years. The corrective action taken by the licensee is considered satisfactory and this item is considered closed.

(Closed) Inspector Follow-up Item 50-335/89-05-02, Corrective Actions to Prevent SwRI Staff from Inattentiveness on the Job

On February 23, 1989, an inspector entered the containment building to observe ISI and modification activities of interest, including the UT examination of the RPV. Upon approaching the console center, the inspector observed that the operator was experiencing some difficulty staying awake at a time when the mechanized tool was scanning the RPV inlet nozzle. Following this observation, the inspector contacted the licensee's ISI coordinator and communicated what had been observed. Following a brief discussion, he (FPL's ISI coordinator) summoned the SwRI project manager and informed him of the aforementioned incident. During this meeting, the inspector ascertained that (1) FP&L Policy Statement to all site personnel, dated June 18, 1987, prohibits individuals from sleeping within the plant boundaries at any time, including break and lunch times, (2) SwRI's work schedule provided for two twelve (12) hour shifts with one hour overlap for a total of thirteen (13) hours a day, seven days a week, (3) there were no provisions for scheduled breaks during working hours except for a 30-minute lunch break.

In discussing this incident with the aforementioned personnel, the inspector stated that, based on these working conditions (thermally hot work area) and the nature of the job (monotonous/tedious, heavily dressed with protective clothing), it was not surprising that the operator was experiencing these kinds of difficulties. Therefore, the subject incident was not so much the fault of the operator but, rather, a problem directly related to work policy practices established by SwRI management. The inspector stated that, because the RPV examination was in progress, immediate short-term corrective action would have to be implemented which should be followed by long term corrective measures that would prevent the recurrence of similar incidents. Accordingly, the licensee imposed a 15-minute break for every two hours of work to be taken by the console operator beginning with 17:30 hours on February 23, 1989. An interoffice correspondence issued by the ISI Coordinator dated February 24, 1989,

formalizes this short term corrective action. This memo also stated that subject operator was no longer allowed on site and that this type of behavior was not tolerated at the St. Lucie Plant under any circumstances. Moreover, in response to the inspector's request for timely corrective action, the SwRI Field Supervisor issued a memorandum to the licensee's Plant Manager, dated March 2, 1989, describing the status of SwRI short and long term corrective action.

During the present Unit 1 outage, the inspector reviewed SwRI long-term corrective action. This consisted of a formalized instruction which defined responsibilities, identified factors that can cause personnel fatigue, factors that can help control personnel fatigue, and implemented controlling requirements. The inspector also observed that SwRI personnel were implementing this written instruction during surveillance of activities performed by SwRI. The inspector concluded that adequate corrective action has been established and implemented by FP&L and SwRI to ensure that this incident does not recur. Therefore, this item is considered closed.

Within the areas examined, violations or deviations were not identified.

5. Exit Interview

The inspection scope and findings were summarized on February 16, 1990, with those persons indicated in paragraph 1 above. The inspector described the areas inspected and discussed in detail the inspection results. Proprietary information is not contained in this report. Dissenting comments were not received from the licensee.