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

Report Nos.: 50-335/94-08 and 50-389/94-08

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: March 7 - 11, 1994

Inspectors: J J Lenahan For
B. R. Crowley — Date Signed: 4/7/94

J J Lenahan
J. J. Lenahan — Date Signed: 4/7/94

Approved by: W O Shumlock for
J. J. Blake, Chief — Date Signed: 4-8-94
Materials and Processes Section
Engineering Branch
Division of Reactor Safety

SUMMARY

Scope:

This routine, announced inspection was conducted on site in the areas of Inservice Inspection (ISI), Erosion/Corrosion (E/C), Technical Specification (TS) Snubber Surveillance Program, modifications to pressurizer relief valve discharge piping, review of the pressurizer relief tank over-pressurization event, material condition and housekeeping, and corrective actions for previous inspection findings.

Results:

In the areas inspected, two violations (VIOs), one regarding failure to issue a nonconformance report to disposition discrepancies involving a damaged pipe and pipe support - paragraph 6, and the other regarding inadequate inspection and evaluation of effects of a waterhammer event on Safety Relief Valve (SRV) and Power Operated Relief Valve (PORV) discharge piping - paragraph 7, were identified. No deviations were identified.

An unresolved item was identified regarding clarification of the safety classification of the PORV and SRV discharge piping, paragraph 7.

Relative to the ISI and E/C activities, good performance was observed. The ISI program is considered to be a strength. Quality ISI inspections were being performed in a professional manner by qualified personnel in accordance with approved procedures. The licensee has a pro-active E/C program in place that should ensure that thinned piping is identified before failure. During this outage, the Number 4 Extraction Steam piping was replaced with Chromium Molybdenum (Cr-Mo) material. The E/C program does not include small bore (2" and less in diameter) piping, but a plant study has shown that small bore piping has not been a problem. However, further evaluation of the need for a small bore program is planned. The snubber surveillance program complies with Technical Specification requirements.

Strengths were identified in material condition and housekeeping.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

G. Alexander, Supervisor, Nondestructive Examination (NDE)
*E. Anderson, Senior Specialist - Inservice Inspection ISI
J. Brady, Mechanical Maintenance Engineering Supervisor
F. Carr, Nuclear Energy Specialist - NDE
T. Coste, Principle Quality Assurance Engineer
K. Crosby, Mechanical Area Quality Control (QC) Supervisor
**H. Fagley, Construction Services Site Manager
*T. Geissinger, Construction QC
W. Kline, Erosion Corrosion (E/C) Engineering Supervisor
W. Heise, Eddy Current Inspection ET Coordinator, Level III
**J. Hosmer, Manager of Engineering
**K. Mayhew, Site ISI Coordinator
**L. McLaughlin, Licensing Manager
*F. McLynn, Construction Services Supervisor
*L. Motley, Supervisor Code Programs
T. Newsome, E/C Specialist
D. Nowaksowski, NDE Level III
E. Pugh, E/C Engineer
*D. Sager, Vice President, Plant St. Lucie
*R. Sipos, Project Manager, Steam Generator Replacement Project
*K. Smart, NDE Supervisor, Level III Specialist
C. Ward, Site Engineering

Other licensee and contractor employees contacted during this inspection included engineers, QA/QC personnel, security force members, technicians, and administrative personnel.

NRC Employees

*S. Elrod, Senior Resident Inspector

*Attended exit interview.

**Attended exit interview and participated in March 16, 1994, conference call.

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

2. Inservice Inspection - Unit 2 (73753)

The inspectors 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 Unit 2 ISI is the American Society of Mechanical Engineers Boiler and Pressure Vessel (ASME B&PV) Code, Section XI, 1989 Edition. The beginning date for commercial

service was August 8, 1983. The current outage is the first outage of the first period of the Second Ten Year ISI interval, which began August 8, 1993, and ends August 8, 2003. The Second Ten Year Interval ISI Program was forwarded to the NRC by FP&L letter L-93-191 dated August 4, 1993. A Safety Evaluation Report (SER) has not been issued.

ISI is performed by the Corporate Code Programs Section under the direction of the Site ISI Coordinator. Contract examination personnel perform examinations to licensee procedures and inspection program under the supervision and direction of the Code Programs Section.

a. ISI Program Review

The inspectors reviewed the ISI program procedures. The purpose of the ISI program review was to verify:

- The plan had been approved by the licensee
- Relief requests had been approved by NRR
- The services of an Authorized Nuclear Inservice Inspector (ANII) had been procured and that the ANII was involved in ISI-activities.
- Procedures and plans had been established (written, reviewed, approved and issued) to control and accomplish the following applicable activities: program organization including identification of commitments and regulatory requirements, preparing plans and schedules, and qualification, training, responsibilities, and duties of personnel responsible for ISI; NDE personnel qualification requirements; and guidance for identifying and processing relief requests.

Procedures reviewed were as follows:

- PSL-200, Revision 0, Second Inspection Interval Program Plan and Schedule
- PSL-200-40-1, Revision 0, Changes A-D, Second Inservice Inspection Interval, First Period Inservice Examination Plan and Schedule
- PSL-201, Revision 0, Second inspection Interval Inservice Inspection Selected Component Schedule
- QI 10-PR/PSL-4, Revision 8, Plant Inservice Inspection
- CSI-ET-94-01, Eddy Current Examination Plan for Steam Generator Tubing at St. Lucie Unit # 2
- JPN-QI 2.14, Revision 2, ASME Section XI Inservice Inspection (ISI)

- JPN-QI 9.2, Revision 2, Nondestructive Examination (NDE) Activities

- JPN-QI 9.3, Revision 1, Nondestructive Examination (NDE) Personnel Qualification and Certification

- JPN-CPS 6.1, Revision 1, Control of Field General Document Data Packages

- JPN-CPS 10.2, Revision 0, Preparation of Relief Requests

b. Review of Procedures

The inspectors reviewed the following NDE procedures to determine whether these procedures were consistent with regulatory requirements and licensee commitments. The procedures were reviewed in the areas of procedure approval, requirements for qualification of NDE personnel, compilation of required records, and division of responsibility between the licensee and contractor personnel. In addition, the procedures were reviewed for technical adequacy and conformance with ASME, Sections V and XI, and other licensee commitments/requirements.

- NDE 1.3, Revision 5, Eddy Current Examination of Non-Ferromagnetic Tubing With MIZ-18

- NDE 2.2, Revision 5, Magnetic Particle Examination

- NDE 3.3, Revision 6, Liquid Penetrant Examination Solvent Removable Visible Technique

- NDE 4.3, Revision 5, Visual Examination VT-3

- NDE 5.2, Revision 6, Ultrasonic Examination of Ferritic Piping Welds & $\leq$ 2" Thick Vessels

- NDE 5.4, Revision 10, Ultrasonic Examination of Austenitic Piping Welds & $\leq$ 2" Thick Vessels

- ECT Data Analysis Guideline and performance Demonstration St. Lucie Unit # 2

c. Observation of Work and Work Activities

The inspectors observed work activities, reviewed NDE personnel qualification records, and reviewed certification records of NDE equipment/materials, as detailed below. The inspectors verified: availability of and compliance with approved NDE procedures, compliance with Code requirements, use of knowledgeable NDE personnel, and use of NDE personnel qualified to the proper level. In addition, general inspection quality, including in-process documentation, and inspection results were evaluated.

(1) Liquid Penetrant Examination (PT)

The inspectors observed the in-process PT examination of weld SI-213-FW-1 in Zone 062-02-062. Observations were compared with the inspection attributes of the applicable procedure and the ASME B&PV Code to verify the performance of an acceptable examination.

(2) Magnetic Particle (MT) Examination

The inspectors observed the in-process MT examinations of welds MS-1-FW2 and MS-1-1-SW-1-LS in Zone 065/02-065-A. The observations were compared with the inspection attributes of the applicable procedure and the ASME B&PV Code to verify the performance of acceptable examinations.

(3) Ultrasonic (UT) Examination

The inspectors observed the in-process UT examinations as indicated below. The observations were compared with the inspection attributes of the applicable procedure and the ASME B&PV Code to verify the performance of acceptable examinations.

Examinations Observed

Zone	Support/Component	Type Exam
062-02-062	SI-213-FW-1	45° and 60°
065/02065A	MS-1-1-SW-1-LS	45° and 60°
065/02065A	MS-1-FW-2	45° and 60°

(4) Visual (VT) Examination

The inspectors observed the in-process VT examinations as indicated below. The observations were compared with the inspection attributes of the applicable procedure and the ASME B&PV Code to verify the performance of acceptable examinations.

Examinations Observed

Zone	Support/Component
189/02-189	CCWST - Support 1
189/02-189	CCWST - Support 2
106/02-106-B	CC-2063-6488

106/02-106-A	CC-2063-7408
106/02-106-B	CC-2063-6474
106/02-106-B	CC-2063-76A*

*Inspected from floor only - complete inspection to be performed by EBASCO (contract) inspectors later during current outage from a ladder.

(5) Eddy Current (ET) Examination

At the time of the inspection, the ET inspection of steam generator (SG) tubes had been completed. The inspectors randomly selected a number of tubes, listed below, and reviewed the ET data, including: MIZ-18 acquired data, the primary and secondary reader analysis and results, resolution analysis, and calibration data (Cal SG1OCCAL00006).

Examinations Reviewed

SG	Tube Row/Line
A	R49/L85
A	R49/L87
A	R44/L90
A	R49/L95
A	R45/L97
B	R38/L118
B	R45/L77
A	R56/L80
A	R132/L104

In addition the inspectors reviewed the overall inspection plan and the inspection results for the current outage. The following summarizes the plan and results:

- Each SG contains 8411 tubes. Prior to the current inspection, 264 tubes in SG A and 194 tubes in SG B had been plugged.

- The initial 1S inspection sample included approximately 20% of the tubes in each SG as follows:

	SG A	SG B
Degraded Tubes from Prev. Inspections (20% - 39%)	134	102
No Detectable Defects from Prev. Inspections	1496	1543
TOTAL 1S SAMPLE	1630	1645

In addition to the 1S Bobbin Coil sample above, the original planned sample included augmented Mechanized Rotating Pancake Coil (MRPC) inspections of 25% of the hot leg tube sheet expansion transitions and 3% of the cold leg expansion transitions. MRPC was also used as a diagnostic examination to clarify or confirm selected Bobbin Coil indications.

Based on inspection results, the Bobbin Coil inspection sample was expanded to 100% of the in-service tubes in both SGs. The MRPC inspection of the hot leg tube sheet expansion transitions was also expanded to 100% of the tubes in service. The following summarizes the inspection results:

	SG A	SG B
Total Indications (20% to 39% Degradation)	227	167
Total Indications (≥ 40% Degradation)	5	1
Total Tubes Plugged		
Preventive (>35%)	0	1
≥ 40% Degradation	5	1
Circumferential Ind.	0	2

The 2 circumferential indications in SG B were at the hot leg tube sheet expansion transition. The majority (217 in SG A and 153 in SG B) of the ≥ 20% indications were wear indications at the U-bend diagonal supports.

(6) Personnel Qualification/Certification

The inspector reviewed personnel qualification documentation as indicated below for examiners who performed the examinations detailed in paragraphs (1), (2), (3), (4), and (5) above. 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 Reviewed

Method	Level	Employer	Number
PT	II	EBASCO	3
PT	III	EBASCO	1
MT	II	EBASCO	4
UT	IT	EBASCO	2

Examiner Records Reviewed Cont'd.

Method	Level	Employer	Number
UT	II	EBASCO	4
UT	III	EBASCO	1
VT	II	EBASCO	2
ET	IIA	FP&L	2
ET	III	FP&L	2
ET	IIA	ZETEC	1
ET	IIIA	ZETEC	3
ET	IIA	NDE TEC	8
ET	III	NDE TEC	2
ET	I	ABB	5
ET	II	ABB	4
ET	IIA	ABB	2
ET	III	ABB	4
ET	I	MAST LEE	6
ET	IIA	VER & JONES	2

In addition, Site Orientation training records were reviewed for 40 ET contractors used for the inspection.

(7) Equipment Certification Records

Equipment/material certification records, as listed below, for equipment/materials used in the inspections detailed in paragraphs (1), (2), (3), (4), and (5) above were reviewed to ensure compliance with applicable requirements.

Equipment Type	Equipment Identification
Penetrant Cleaner	Batch 93L07K
Penetrant	Batch 90J046
Penetrant Developer	Batch 88L084
MT Test Plate	Serial MCI-MT-4
UT Transducer	Serial 90812
UT Transducer	Serial 90808
UT Transducer	Serial E04502
UT Transducer	Serial E04498

Equipment Type	Equipment Identification
UT Instrument	Serial 136-300D
UT Instrument	Serial 136-171A
UT Couplant	Batch 092061
Thermometer	Serial 93-004
ET Calibration Standards	Serials Z-12327, Z-11371, Z-12328, Z-11372, Z-12329, Z-11367, Z-12330, Z-11373, Z-12333, Z-11374, Z-12332, Z-11368
ET MIZ-18A RDAUs	Serials 009, 020, 023, 041, 056, 061, 069, 072, 111, 185, 195

RESULTS

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

Good performance was observed in the area of ISI. Examinations were being conducted in a conscientious manner by qualified personnel in accordance with approved procedures and required Codes. All inspections observed were performed in a quality manner. Level III personnel were involved with the inspection process. Neat and orderly records were being generated and maintained. Results of ET of SG tubes indicated that the majority of degraded tubes are degraded by wear and the increase in the number of degraded tubes is relatively small.

3. Flow Accelerated Corrosion (FAC) Program - Units 1 and 2 (49001)

See NRC Inspection Reports 50-335,389/91-24, 50-335,389/92-09 and 50-335,389/93-10 for documentation of previous inspections in this area.

In response to Generic Letter (GL) 89-08, Erosion/Corrosion Pipe Wall Thinning, licensees have implemented long term Erosion/Corrosion (E/C) or FAC programs. The current inspection evaluated various aspects of the program to determine if a defined program was in place and if it appeared the scope of the program was adequate to identify degraded piping. The following is a summary of the inspection activities and results:

a. Program Status

Based on discussions with licensee personnel, review of the documents listed in paragraph b. below, and observation of the inspections listed in paragraph c. below, the following actions have been completed by the licensee:

- Three full time corporate engineers have been assigned to develop and implement the E/C programs at St. Lucie and Turkey Point.

- A detailed program and implementing procedures have been issued.

- Component selections for inspections were based on (1) EPRI CHECMATE Model, (2) plant experience, (3) industry experience, and (4) engineering judgement. The following systems were included in the program:

  Main Steam

  Condensate (From the No,. 2 LP Heater to the Feedwater Pumps)

  Feedwater (From Feedwater Pumps to Steam Generators)

  Steam Generator Blowdown (Seismic)

  Forward Pumped Heater Drains (No. 5 HP Heater to No. 4 LP Heater to Drain Cooler to Heater Drain Pump Inlet)

  Heater Drain Pump Discharge to Condensate System Tie-in

  Reheated Heater Drains (to Shell Side No. 5 HP Heater)

  Moisture Separator Heater Drains (to Shell Side No. 4 LP Heater)

  Cascading Heater Drains (No. 3 LP Heater to No. 2 LP Heater to No. 1 LP Heater)

  Nos. 4 and 5 Extraction Steam

  Nos. 1, 2, and 3 Extraction Steam

  Turbine Crossunder Piping

- EPRI CHECMATE Models and CHEC-NDE are being used. Pass 1 CHECMATE analysis was completed before 1992 and used in sample selection for the 1992 and 1993 Unit 1 outages and for the current and 1992 Unit 2 outages.

- VECTRA Technologies has been hired to independently verify the Heat Balances and P&IDs for the CHECMATE Models. The Unit 2 verification has been completed and the Unit 1 is scheduled to be completed prior to issue of the next outage plan.

b. Review of Procedures

The inspectors reviewed the following documents which defined the E/C program:

- JPN-ESI-E/C/100, Revision 0, Long-Term Erosion/Corrosion monitoring Program
- ESI-EC-PSL-2-8P, Revision 0, Winter 1994 Outage Cycle 8 Erosion/Corrosion Outage Inspection Plan
- JI-CPS 2.3-1, Revision 0, Identification of Susceptible Systems and Components
- JI-CPS 2.3-2, Revision 0, Performing Erosion/Corrosion Analysis
- JI-CPS 2.3-3, Revision 1, Selection of Locations for Examination
- JI-CPS 2.3-4, Revision 1, Evaluation of Examination Data
- JI-CPS 2.3-5, Revision 0, Evaluation of Worn Components
- JI-CPS 2.3-6, Revision 0, Marking and Gridding for Erosion/Corrosion
- NDE 5.18, Revision 3, Ultrasonic Thickness Measurement

c. Observations and Reviews

In addition to review of the above program, procedures, and plans, the inspectors observed in-process activities and reviewed other aspects of the E/C program as detailed below:

- The examination plan for the current outage included 156 inspection locations. Sixty of the 156 locations were baseline inspections for new piping installed. In addition, visual inspections of selected locations of the Turbine Cross-Under piping was included. At the time of the inspection, essentially all of the 96 (existing pipe) planned inspection locations had been completed. The results required sample expansion for six locations. Inspection of the sample expansion locations were still in process.
- In-process grid layout was observed for components 20ES3-X-1-27 and 20ES3-E-8-28. In addition, UT thickness measurement was observed for component 20ES3-X-1-27.
- Inspection records and data analysis were reviewed for components I-2B1-P-16-32, I3B62P2, 24C37-T-1-8M and 8MS24-E-1-3.

- The inspectors examined licensee's past practice and future plans for material replacements for E/C degraded piping, i.e., practices for replacing "like for like" or upgrading to better materials. The general practice is to replace carbon steel with Cr-Mo material. During the current outage the #4 Extraction Steam piping (230 feet of 24" diameter piping), shown to be thinning during previous inspections, was replaced with Cr-Mo material. The inspectors observed the new piping installation.

- The following two areas for program improvement were noted:

  The program currently does not include small bore (≤ 2" diameter) piping. When questioned by the inspectors, the licensee provided a recently completed study, "Small Bore High Energy Piping Study" dated February 14, 1994, that looked at small bore leaks occurring since 1990. This study found that through-wall leaks in small bore piping had been very few and were predominately caused by faulty steam traps. The problems with steam traps are being addressed. Even though the problems with through-wall leaks in small bore piping have been minimal, the study recommends that a pilot program for E/C inspections of small bore piping be initiated. Responsible licensee personnel stated that this recommendation will be implemented.

  Line Correction Factors have not been entered and the Pass 2 analysis completed with the measured data for the CHECMATE Model. Discussions with licensee personnel indicated that they were waiting to obtain measured data for two outages using the CHECMATE Model before updating the Model with measured data and Line Correction Factors. The purpose for waiting was to obtain more accurate wear data based on two successive measurements. This outage will complete the second set of measurements. Therefore, plans are to update the model before the next outage.

RESULTS

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

The licensee has a pro-active E/C program. The detailed program, dedicated personnel and resources, the use of the EPRI CHECMATE Models, and the wholesale pipe replacements (230 feet of 24" diameter #4 Extraction Steam Piping during the current outage) with better grade materials illustrate this pro-active approach.

4. Housekeeping and Material Condition - Units 1 and 2 (62700)

The inspectors performed a walkdown inspection in the Unit 2 reactor containment building, the Unit 2 auxiliary building, the Unit 2 steam tressel, the Units 1 and 2 intake structures, and the Units 1 and 2 component cooling structures and examined housekeeping, material condition, and protective coatings.

Material condition and housekeeping was excellent in the areas walked down. A few minor deficiencies were identified in the condition of protective coatings. These were as follows:

- The exterior concrete coatings were deteriorated on two concrete coated steel pipes which extend across the front of the intake structures above the sea level walkways.

- Some minor corrosion was noted on some nuts and bolts on the base of the Unit 2 steam tressel.

- Field applied coatings were peeling and flaking on Heating Ventilation and Air Conditioning ductwork in the Unit 2 reactor containment building.

The inspectors also identified a piece of deteriorated unistrut supporting an electrical pull box in the Unit 2 intake enclosure. Although the unistrut was deteriorated by severe corrosion, it was still capable of performing its function.

Material condition and housekeeping was rated as a strength.

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

5. Snubber Surveillance Program - Unit 2 (70370)

The inspectors reviewed procedures and quality records related to the snubber surveillance program, observed snubber visual inspection and functional testing activities, and inspected safety-related snubbers installed on selected Unit 2 piping systems. Acceptance criteria utilized by the inspectors appear in Technical Specification 3/4 7.9.

a. Review of Snubber Surveillance Procedures

The inspectors reviewed the following procedures which control snubber surveillance and inspection activities.

- FP&L Quality Instruction number QI 10-PR/PSL-6, Revision 6, Control, Inspection and Monitoring of Mechanical and Hydraulic Snubbers

- FP&L Operations Surveillance Procedure number OSP-73.01, Revision 0, Guidelines for the Implementation of the Snubber Inspection and Test Program

- FP&L Document number JPE-M-87-103, Revision 14, St. Lucie Units 1 and 2 Snubber Testing Acceptance Criteria

- FP&L Drawing number 2998, B-122, Sheets 1 through 23, Revision 8, Seismic Snubber List

- Lisega Procedure number SP-1227-005, Control Valve Changeout and Test, Lisega Model number 310250

The licensee's visual inspection program includes two types of examinations for mechanical snubbers. The first is the VT 3 exam, which is visual inspection of the snubber to determine the general mechanical and structural condition of the snubber, and includes measurement of snubber extension and pin to pin dimensions. The second visual inspection is the VT 4 exam which includes a limited operability test to verify the snubber is free to move over its full range of travel. The VT 4 exam is an optional test the licensee performs on all mechanical snubbers size PSA 10 and smaller, which are not scheduled for functional testing. Snubbers which appear to have restrictions to motion are then subjected to functional testing to determine if they are operable. Inoperable snubbers are replaced.

b. Observation of Snubber Inspection/Testing Activities

The inspectors observed visual inspection of snubber number 2-212. Visual inspection, which was performed by Siemen's contract inspectors, included measuring snubber extension and pin to pin dimensions, inspecting alignment, parts and fasteners, and overall general condition. The visual inspection was performed in accordance with procedural requirements. The inspectors witnessed installation of new control valves in steam generator snubber number 005. New control valves were installed in accordance with manufacturer's recommendations per procedure SSP-1227-005. The valves are removed from the large bore Lisega steam generator snubbers for functional testing to demonstrate snubber operability. This is in accordance with vendor recommendations. After the valves are tested, they are re-installed in other steam generator snubbers. The licensee was testing 100 percent of the control valves on all sixteen steam generator snubbers. These snubbers had been installed during the last refueling outage to replace the older model snubbers installed during original construction.

The inspectors examined steam generator snubber numbers 004, 006, and 007 and verified that the snubbers were properly attached to steam generator 2A and the supporting structure. The inspectors also performed a walkdown inspection in the Unit 2 containment

building and verified that snubbers installed on various piping systems were secure, and for hydraulic snubbers, that no fluid leakage was occurring. No deficiencies were observed by the inspectors.

The inspectors witnessed functional testing of the following snubbers: Size PSA ¼ - serial numbers 38003, 38026, and 38532; Size PSA 1 - serial number 19223; and Size PSA 3 - serial number 25895. The PSA 3, which was from snubber location 2-169, failed the functional test. This had been previously identified as a visual inspection (VT-4) failure. The results of the functional tests performed on the remaining snubbers met the acceptance criteria.

The inspectors witnessed disassembly and inspection of three snubbers which failed functional testing. These were snubbers from support numbers 2-169, 2-066, and 2-185. The tear down inspection showed the following degraded conditions:

- A bent/broken shaft in snubber 2-185. This was later attributed to a water hammer and is further discussed in paragraph 7 below.

- Corrosion and excess dried grease in snubber 2-066. This was attributed to the location (environment) where the snubber was installed.

- Internal damage in snubber 2-169. This was also later attributed to the November 24, 1992, water hammer event.

c. Review of Quality Records

The inspectors reviewed quality records documenting visual inspection and functional testing of safety-related snubbers. Review of the functional test records showed that Snubber Tag numbers 2-066, 2-241, 2-242, 2-315, 2-316, and 2-334 did not meet the licensee's functional test acceptance requirements. These snubbers were tested per the TS functional testing program. Because of these functional test failures, the licensee expanded the functional test sample to test five additional groups in accordance with TS 4.7.9.d.

The licensee also performed functional testing on snubbers which for freedom of motion per the VT-4 exam indicated impaired operability. The following snubbers did not meet the licensee functional test acceptance requirements:

Tag numbers 2-67, 2-70, 2-73, 2-102, 2-144, 2-156, 2-169, 2-177, 2-178, 2-185, and 2-322.

The functional test failures were documented on nonconformance reports and transmitted to the licensee's design engineering organization for evaluation.

Review of the snubber test data showed the following trends.

- Snubber numbers 2-066, 2-067, 2-070, 2-073, and 2-102 had been installed on safety injection piping near the reactor coolant piping. These snubbers had been subjected to high temperature and humidity conditions.

- Four snubbers, number 2-144, 2-156, 2-169 and 2-185 had been installed on the pressurizer safety relief or PORV discharge piping, and had been subjected to a water hammer on November 24, 1992, as discussed in paragraph 7, below.

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

6. Review of Modifications to Pressurizer Safety Relief Valve Discharge Piping - Unit 2 (37701)

The inspectors examined Plant Change/Modification (PC/M) 004-293, which was being implemented by the licensee to correct leakage of the three Code Safety Relief Valves (SRVs) on the pressurizer. This modification was classified as a quality related modification since it affected piping which was seismically analyzed and supported. Modification P C/M 004-293 involved replacing three supports on the tailpipes, replacing the Tee on the pressurizer quench tank, and some piping modifications to relieve stresses on the SRVs being induced by thermal movements of the pressurizer relative to the tailpipes. The inspectors reviewed the modification package to examine the work in progress.

The insulation had been removed from the piping and one of the new supports had been installed, while one other new support, a constant support, was partially completed. Portions of the piping had also been cut to relieve any residual stresses and to permit adjustments to accommodate predicted piping movements. The inspectors examined the two supports. Acceptance criteria utilized by the inspectors are the reference drawings listed below. Supports examined were as follows:

- Partially completed Support Mark No. RC-4300-6128, Drawing No. BCS 004-293.3013, Sheets 1 and 2 of 2.

- Support Mark No. RC-4300-6124, Drawing No. BCS 004-293.3014, Sheets 1 and 2 of 2.

The inspectors also examined quality records related to inspection of Support No. RC-4300-6124. These included weld travelers and weld visual inspection records. The inspectors concluded that the support had been installed in accordance with the design requirements. The inspectors also concluded that the portions of Support Mark No. RC-4300-6128 installed to date were in accordance with design requirements.

During the walkdown and further review of the PC/M documentation, the inspectors noted that the pipe support end piece and a spool piece at support number RC-4300-138 (snubber tag No. 2-170) on line number 6"-RC-827 were found to be damaged on March 5, 1994, when the pipe insulation and pipe were removed for the modification work. The inspectors questioned licensee engineers regarding the cause of the damaged pipe, which was deformed, and pipe support end piece, which had a cracked weld. These discussions disclosed that the damage occurred during the November 24, 1992, pressurizer relief tank overpressurization event. The inspectors questioned the licensee engineers regarding whether a nonconformance document had been prepared to document the damaged pipe and pipe support end piece. The inspectors determined that no nonconformance documents had been prepared as of the time of the discussions (10:00 AM on March 10, 1994). Licensee engineers stated that a Change Request Notice (CRN), number 004-293-4356, had been issued on March 7, 1994 to remove the pipe end piece and re-install it on a new piece of pipe. The work was completed under the CRN.

FP&L Administrative Site procedure ASP-8, Corrective Action, Revision 6 requires that discrepancies that require an engineering evaluation be documented, evaluated and dispositioned using a Nonconformance Report (NCR). The note under paragraph 7.2 of FP&L Administrative Site Procedure ASP 4, Change Request Notice Control Revision 4, states that a CRN shall not be utilized in lieu of a NCR to correct deviations from PC/M design documents. The damaged pipe and cracked welded attachment on the pipe support end piece constituted a deviation from the PC/M design documents.

The failure of licensee engineers to issue a NCR to document the discrepancy (damaged pipe and cracked welded attachment on the pipe support end piece), and use of a CRN to repair the discrepancy, was identified to the licensee as Violation of 10 CFR 50, Appendix B, Criterion V for failure to follow procedures. This was identified as Violation item 289/94-08-01, Failure to Follow Corrective Action Procedures, which is applicable to Unit 2 only.

Discrepant Field Condition report No. 4180 and NCR 004-293-3025M were issued by the licensee in the afternoon of March 10, 1994, to properly document and disposition the damaged pipe and pipe support end piece.

In the areas inspected, one violation and no deviations were identified.

7. Review of Licensee Engineering Actions in Response to Pressurizer Relief Tank Overpressurization Event - Unit 2 (37700)

On November 24, 1992, while Unit 2 was operating at 100 percent power, the pressurizer relief (Quench) tank was overfilled. When the tank was overfilled, water backed up into the tank inlet piping (the SRV and PORV discharge piping) until the cold water came in contact with the SRV's, resulting in lifting of one of the SRVs on the pressurizer. The lifting of the SRV resulted in a 45 psi decrease in reactor coolant pressure and rupturing of the relief tank rupture disk. The Unit was shut down after this occurred. During the subsequent plant outage, walkdown inspections were performed by licensee engineers to examine supports on the SRV and Power Operated Relief Valve (PORV) discharge piping.

The results of the walkdown inspection were documented in an FP&L memo dated November 30, 1992, from D. Nowakawski to C. Ward, Subject St. Lucie Unit 2, Pressurizer Safety Valve Piping "Cold" and "Hot" Examination. The walkdown inspection consisted of a visual examination of 19 snubbers and 2 spring cans on the SRV discharge piping on November 25 for cold setting and on December 1 for hot setting. The snubber extensions and spring can settings were measured, and the piping was checked for presence of insulation and interferences. Insulation was not removed to inspect welded attachments to the piping or the condition of the piping, and no freedom of motion tests were performed on the snubbers.

Additional walkdown inspections were performed on the PORV tail piping. The results of these inspections were documented in undated handwritten note which summarizes telephone conversations on November 28, 1992, and November 30, 1992, regarding the results of the visual inspections. The November 28, 1992, telephone conversation summarizes damage found on three rigid struts on support numbers RC 4300-60, -210, and -590. The paddles were found to be bent on these supports. The November 30, 1992, telephone conversation stated that site engineering expanded the inspection to six additional supports. Inspection results showed no visual damage to the six supports. Discussions with licensee engineers disclosed that insulation was not removed to examine the PORV piping, snubbers were not subjected to freedom of motion tests, and that visual inspections were not conducted on all PORV supports. The licensee concluded that a water hammer occurred when the SRV lifted, resulting in damage to the three struts.

The licensee initiated a Work Order (PWO), number 92056154 01, to repair the bent struts on the three supports. Repairs to an additional pipe support was later included under this same PWO. The inspectors reviewed the completed PWO and the quality control reports which summarizes the corrective actions to repair the bent struts.

During the current outage, the licensee discovered additional damage to supports on the PORV and SRV discharge piping. This included the damaged piping and pipe support end piece for support number RC-4300-138 (snubber tag number 2-170) on the SRV discharge piping, discussed in paragraph 6.0, above, and four snubbers, tag numbers 2-144, 2-156, 2-169, and

2-185, discussed in paragraph 5, which were found to have impaired operability on the PORV discharge piping. The reasons for these problems were attributed to the water hammer which occurred during the November 24, 1992, event.

Subsequent to the inspection, on March 16, 1994, in a telephone conservation with licensee engineering personnel, the inspectors discussed the licensee's actions to evaluate the extent of damage which occurred during the November 24, 1992, event.

These discussions disclosed the following information:

- Licensee engineers stated that it was not necessary to write a NCR to cover the damaged struts since the root cause of the problem was known, and the hardware problem had been corrected using PWOs. This was in accordance with FP&L Procedure QI 15-PR/PSL-1.

- In 1992, when evaluating the water hammer damage, licensee engineers estimated the magnitude of the water hammer forces acting on the damaged struts were approximately 1000 pounds in the lateral direction. Based on information obtained during the current outage, licensee engineers increased their estimate of the water hammer forces to range from 6000 to 8000 pounds.

- Licensee engineers stated that, based on their judgement, the SRV and PORV discharge piping was operable from 1992 - 1994, even with the five inoperable/damaged supports. This conclusion is based on engineering judgment only, since a stress analysis was not performed on the piping with five inoperable/damaged supports.

- Licensee engineers stated that piping was non-safety related, although seismically designed and that failure of the piping would not affect the reactor coolant pressure boundary.

- Licensee engineers stated that inspection of the piping and pipe supports following the waterhammer event was performed without the use of documented instructions or procedures.

In November 1980, NRC issued NUREG-0737, Clarification of TMI Action Plan Requirements. Item II.D.1 of NUREG 0737 required licensees to perform eight actions to reconfirm the integrity of PWR reactor coolant overpressure protection systems (i.e., PWR safety, relief and block valves) and thereby assure that General Design Criteria 14, 15, and 30 of Appendix A to 10 CFR 50 are met. Action 8 under II.D.1 states: Qualify the plant specific safety and relief valve piping and supports by comparing to test data and/or performing appropriate analysis. In December, 1988, NRC issued a Technical Evaluation Report, (TER) titled TMI Action - NUREG 0737 (II.D.1) Relief and Safety Valve Testing St. Lucie, Unit 2, Docket No. 50-389. Paragraph 5.2 of the TER stated that Item 8 which requires qualification of the piping and supports on the pressurizer SRV and PORV discharge piping was not met. The licensee was

requested to submit additional information to NRC to demonstrate that the piping was designed with sufficient margin such that design conditions would not be exceeded during relief/safety valve events. In FP&L letter, number L-90-135, to the NRC dated August 30, 1990, the licensee stated that they had completed the analytical work required to resolve NRC concerns stated in paragraph 5.2 of the TER.

The inspectors reviewed drawing numbers RC-AB-1 Revision II, and RC-AB-2, Revision 10. No safety classification was indicated for the SRV 6" diameter discharge piping and 10" diameter common header on drawing RC-AB-1. The PORV discharge piping was shown as non-safety related on drawing number RC-AB-2. The inspector also reviewed P&ID drawing numbers 2998-G-078, sheets 108 and 109. These drawings indicated the PORV and SRV discharge piping was classified as Quality Class D, i.e. non-safety related outboard of the relief valves. These same drawings are FSAR figures 5.1-4 and 5.1-4a. The drawings appeared to be in conflict with FSAR Section 5.4.11, which covers the pressurizer safety relief system and quench tank design. FSAR Section 5.4.11.1 states that the pressure relief discharge system is designated Quality Group C, per Regulatory Guide 1.26, "Quality Group Classification and standards for Water-, Steam-, and Radioactive-Waste-Containing Components of Nuclear Power plants", February, 1992, Revision 3. The importance of Quality Group C, which is a safety related designation, is discussed in FSAR Section 3.2.2.

Section 5.4.11 of the FSAR also states that the pressure relief discharge system is designated non-seismic. However, Section 5.4.11.3 of the FSAR states that the piping system from the pressurizer to the quench tank has been seismically analyzed. The licensee's seismic snubber list includes all snubbers on the PORV and SRV tail piping. The seismic snubber list is classified as Nuclear Safety-Related.

Based on review of the FSAR, the Nuclear Safety-related seismic snubber list, and the licensee's responses to TMI Action Item (NUREG 0737) II.D.1, the inspectors concluded that the licensee's actions to followup on the November 24, 1994, waterhammer event fell within the purview of their Quality Assurance Program. The licensee's response to this event was inadequate and resulted in failure to identify the inoperable snubbers and damaged pipe. The engineering evaluation of the effects of the waterhammer on the SRV and PORV discharge piping was also inadequate. Discussions with licensee engineers disclosed that the inspection activities performed to inspect the SRV and PORV discharge piping following the waterhammer event, and the engineering evaluation of the event, were performed without the use of documented instructions or procedures. Performing activities affecting quality without the use of documented instructions or procedures of a type appropriate to the circumstances is contrary to the requirements of 10 CFR 50, Appendix B, Criterion V. This was identified to the licensee as violation item 389/94-08-02, Inadequate Inspection and Evaluation of Effects of Waterhammer event on SRV and PORV Discharge Piping.

The licensee's inadequate response to this event was due in part to their failure to recognize the severity of the November 24, 1992, event. The inoperable snubbers compromised the structural integrity of the SRV and PORV discharge piping. Failure of this piping could have prevented the SRV's and PORVs from performing their safety function.

An unresolved item 335, 389/94-08-03, Quality Level of PORV and SRV Discharge Piping, was also identified to the licensee regarding clarification of the safety classification of the PORV and SRV discharge piping.

In the areas inspected, one violation and no deviations were identified.

8. Licensee Actions on Previous Inspection Findings (92701, 92702)

a. (Closed) Violation 335, 389/91-24-01, Failure to Follow Procedure for Properly Identifying Radiographic Film and Documentation of Associated Records

This violation involved failure to properly identify radiographic (RT) film and incomplete records associated with RT film review. The licensee's letter of response, dated February 11, 1992, was reviewed and found to be acceptable. Corrective actions included the following:

- All RT film and associated records for the period January 1, 1990 through December 31, 1991 were reviewed and all discrepancies corrected.

- The RT Technique Sheet and procedure were revised to clarify and streamline the identification and information required on the records and RT film. A checkoff was provided for the Radiographer to verify all required film identification is legible on the film.

- Personnel were trained on the requirements for film identification and documentation of inspection attributes.

- All permanent RT film shot during the Spring 1992 Unit 2 outage were reviewed by an NDE Level III Examiner.

The inspectors reviewed the following to verify licensee corrective actions:

- Procedure PTN/PSL TS 9:3.3, Revision 1, Radiographic Evaluation

- Training records dated February 3, 1992, for RT personnel.

- Documentation of Level III review of the Spring 1992 Unit outage RT film.

- RT film, RT Reports, Weld Travelers, PT and VT Inspection Reports, and repair records were reviewed for the following welds made during the current outage:

  2F-2-MS-0011-007A
  2F-2-MS-0010-004A
  2F-2-MS-0010-005A
  2F-2-MS-0011-006B

  In addition, the following RT film, reviewed by the Level III examiner for the Spring 1992 outage welds, were reviewed:

  2F-2-BF-008-001A
  2F-2-BF-0014-002
  2F-2-SI-0190-603
  2F-2-SI-0190-602

During review of the film, the inspectors noted that a number of identifications (incorrect dates, illegible identifications, misplaced identifications, etc.) had to be changed by vibro-etching after the film was exposed and processed. Although the films were acceptable, and the need for an occasional change was justified, the number of changes required indicated lack of attention by the radiographer to assure that identifications were proper before the film was exposed. Based on the inspector's observations, all RT personnel received additional training on proper identification of RT film.

Based on the above review and inspections, this item is closed.

b. (Closed) VIO 389/93-08-01, Failure to Provide Adequate Measures to Control Welding

This violation involved failure to perform temper bead weld repairs on pressurizer vapor space nozzles in accordance with ASME Code requirements. The code requirements for the electrode size, the area to be preheated, and marking of the temporary attachment areas were not correctly incorporated into repair instructions, resulting in these activities not being accomplished in accordance with Code requirements. The licensee's letter of response dated May 11, 1993, was reviewed and found to be acceptable. Corrective actions included:

- Correction of the immediate problems identified including removal and re-welding of the weld made with the incorrect size electrode

- Review of the contractor documentation associated with the pressurizer nozzle repairs to assure compliance with applicable Code requirements

- Addition of FP&L engineers at the job site to assure implementation of the welding process in accordance with Code requirements

- Providing a dedicated Project Manager to assist with implementing the weld repair

- QA audit of contractor evolutions and continuous FP&L QC oversite at the work location

- Safety evaluation of the improperly welded temper bead repair

- Revision of the site procedure for procurement of contractor services to: (1) establish guidelines for technical and quality reviews of contractor procedures, and (2) ensure that contractors are well informed during the contractor orientation phase concerning FP&L policy regarding failure to follow procedures

The inspectors discussed the corrective actions with responsible licensee personnel and reviewed the following to verify licensee corrective actions:

- QA Audit Report QSL-OPS-93-10, Performance Monitoring Evaluation (PMON) 93-10-05 dated April 16, 1993

- Contractor Orientation Program Lesson Text - 4711300, Revision 3 and 4711301, Revision 4

- QI 7-PR/PSL-1, Revision 23, Control of Purchased Material, Equipment, and Services

- CE NCR 2001935-4

- PWO 62/9100, W.O. 93007314-01

The final closure review was in process for the NCR and PWO.

The corrective actions taken were considered appropriate for correcting the specific violation and avoiding further similar violations. Based on the above review of corrective actions, the violation is closed.

9. Exit Interview

The inspection scope and results were summarized on March 11, 1994, with those persons indicated in paragraph 1. The inspector described the areas inspected and discussed in detail the inspection findings listed below. Proprietary information is not contained in this report. Dissenting comments were not received from the licensee.

Additional telephone discussions were held with licensee personnel on March 16, 1994, relative to Violations 389/94-08-01 and 389/94-08-02. At the time of the Exit Interview, Violation 389/08-02 was identified to the licensee as an Unresolved Item (URI). During the March 16 telephone discussion, the inspectors informed the licensee that, after further investigation, the URI was considered to be a Violation. The violations were also discussed with the Site Vice-President during a telephone call on April 8, 1994.

(Closed) Violation 335, 389/91-24-01, Failure to Follow Procedure for Properly Identifying Radiographic Film and Documentation of Associated Records

(Closed) VIO 389/93-08-01, Failure to Provide Adequate Measures to Control Welding

(Open) VIO 389/94-08-01, Failure to Follow Corrective Action Procedures - Paragraph 6

(Open) VIO 389/94-08-02, Inadequate Inspection and Evaluation of Effects of Waterhammer Event on SRV and PORV Discharge Piping - paragraph 7

(Open) Unresolved item 335, 389/94-08-03, Quality Level of PORV and SRV Discharge Piping

10. Acronyms

ABBCE	Assea Brown Bovera Combustion Engineering
ANII	Authorized Nuclear Inservice Inspector
ASME	American Society of Mechanical Engineers
B&PV	Boiler and Pressure Vessel
C-CAN	Construction Corrective Action Report
CE	Combustion Engineering
CRN	Change Request Notice
Cr-Mo	Chromium Molybdenum
DFC	Discrepant Field Condition
DR	Deficiency Report
E/C	Erosion/Corrosion
EPRI	Electric Power Research Institute
ET	Eddy Current Inspection
FAC	Flow Accelerated Corrosion
FP&L	Florida Power and Light Company
FSAR	Final Safety Analysis Report
GL	NRC Generic Letter
HP	High Pressure
ISI	Inservice Inspection
LP	Low Pressure
MRPC	Mechanized Rotating Pancake Coil
MT	Magnetic Particle Inspection
MS	Main Steam System
NCR	Nonconformance Report
NDE	Nondestructive Examination

NRC	Nuclear Regulatory Commission
NRR	Nuclear Reactor Regulation
PC/M	Plant Change/Modification
P&ID	Piping and Instrument Flow Diagram Drawings
PORV	Power Operated Relief Valve
PT	Liquid Penetrant Inspection
PWO	Work Order
PWR	Pressurized Water Reactor
QA	Quality Assurance
QC	Quality Control
RII	NRC Region II
RT	Radiographic Inspection
SER	Safety Evaluation Report
SG	Steam Generator
SI	Safety Injection System
SRV	Safety Relief Valve
TER	Technical Evaluation Report
TS	Technical Specification
URI	Unresolved Item
UT	Ultrasonic Inspection
VIO	Violation
VT	Visual Inspection