



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

Report Nos.: 50-335/88-09 and 50-389/88-09

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: May 2-5, 1988

Inspector: B. R. Crowley 5/24/88
 B. R. Crowley Date Signed

Approved by: J. J. Blake 5/24/88
 J. J. Blake, Section Chief Date Signed
 Materials and Processes Section
 Division of Reactor Safety

SUMMARY

Scope: This routine, unannounced inspection was in the areas of maintenance program implementation (Units 1 and 2), inservice inspection (Unit 2), licensee action on previous enforcement matters (Units 1 and 2) and inspector followup items (Units 1 and 2).

Results: No violations or deviations were identified.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

- *J. H. Barrow, Operations Superintendent
- *G. J. Boissy, Plant Manager
- T. Dillard, Maintenance Superintendent
- *J. A. Dyer, QC Inspector
- *D. English, Planning Coordinator - Maintenance
- *K. H. Harris, Vice President, St. Lucie Nuclear Plant
- D. Houldsworth, Lead Instructor, I&C
- *S. C. Sanders, Welding Supervisor - Maintenance
- P. Sarno, Planning Coordinator - Maintenance
- J. Villar, Jr., Lead Instructor - Mechanical Maintenance
- P. Waldrop, Welding Supervisor - Construction
- C. Wilson, Department Head - Mechanical Maintenance
- R. Young, Technical Support Supervisor - Maintenance

Other licensee employees contacted included engineers, QC personnel, security force members, and office personnel.

NRC Resident Inspector

H. E. Bibb, Resident Inspector

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on May 5, 1988, with those persons indicated in Paragraph 1 above. The inspector described the areas inspected and discussed in detail the inspection findings. No dissenting comments were received from the licensee. The following new item was identified during this inspection:

(Open) Inspector Followup Item 335, 389/88-09-01, Clarification of Requirements for Post Maintenance Test and IST.

The licensee did not identify as proprietary any of the materials provided to or reviewed by the inspector during this inspection.

3. Licensee Action on Previous Enforcement Matters

(Closed) Violation 335/87-23-01, 389/87-22-01, Failure to Follow Document Control Procedure. Florida Power and Light Company's (FP&L) letter of

response dated December 30, 1987, has been reviewed and determined to be acceptable by Region II. Based on examination of corrective actions as stated in the letter or response and discussions with responsible licensee personnel, the inspector concluded that FP&L had determined the full extent of the subject violation, performed the necessary survey and followup actions to correct the present conditions and developed the necessary corrective actions to preclude recurrence of similar circumstances. The corrective actions identified in the letter of response have been implemented.

4. Unresolved Items

Unresolved items were not identified during this inspection.

5. Maintenance Program Implementation (62700) (Units 1 and 2)

The inspector examined the licensee's maintenance program as detailed below to determine whether the program was being implemented in accordance with regulatory requirements. Requirements are specified in various regulatory guides, Section 6 of the Technical Specifications, and ANSI N18.7-1976.

Based on interviews of plant personnel, the maintenance activities identified in Paragraphs a., b., and c., below were selected for review. Records associated with the activities were reviewed to determine whether:

- Cause of failure was evaluated and adequate corrective action was taken to reduce probability of recurrence.
- Procedure specified in maintenance package is adequate for scope of maintenance performance.
- Vendor technical manual for equipment under repair is controlled and kept up-to-date.
- Vendor maintenance recommendations are translated or referenced by maintenance procedures.
- Required administrative approvals were obtained before initiating the work.
- Limiting conditions for operation is met while equipment removed from service.
- Approved procedures were used where activity appeared to exceed normal skills of qualified maintenance personnel.
- Inspections made in accordance with licensee's requirements and quality control records are complete.

- Functional testing and calibrations, as necessary, were completed before returning equipment to service and personal performing tests properly qualified.
 - Failures are evaluated and reported in accordance with requirements
 - Corrective and preventative maintenance records are assembled and stored as part of maintenance history.
 - Measuring and test equipment used was identified and in calibration.
 - Parts and materials used were identified and at least met specifications of the original equipment.
 - Special processes were controlled and documented.
 - System lineups were made and verified prior to return to service.
 - Machinery history records are being kept up to date and properly stored.
- a. Safety-Related Equipment Failure Leading to a Plant Shutdown (Unit 1)

On October 8, 1987, an unidentified reactor coolant system leakage greater than the Technical Specification limit resulted in a reactor shutdown. The cause of the event was a leaking check valve bonnet and a cracked pipe at the heat affected zone on the 1A1 Reactor Coolant Pump (RCP) lower cavity seal nozzle weld. The major source of leakage was the cover plate gasket on 2" Check Valve V-2432 in the 1B1 loop charging line. The cause of the valve leakage was a slight loosening of some of the bonnet bolts. The cause of the cracked weld joint was due to misalignment of the RCP lower cavity seal nozzle flange and the RCP lower cavity seal injection line flange. Due to misalignment, the weld was over stressed. Another contributing factor was attributed to inherent vibration of the RCP. The inspector reviewed the following records and documents relative to the event and repair of the check valve and RCP seal nozzle weld:

- Licensee Event Report (LER) 335-87-014 dated November 7, 1987.
- Completed Nuclear Plant Work Order (PWO) 2947 for replacement of bonnet gasket on Valve V-2432.
- Completed General Maintenance (GM) Procedure M-0039
- Completed Post Maintenance Test Forms - Appendix B to QI 11-PR/PSL-2 for PWO's 2947 and 2953
- Completed PWO 2953 for repair to the RCP seal line.
- Weld Traveler for FW-1 for RCP seal line weld.

b. Non-Safety-Related Equipment Failure Leading to Plant Shutdown
(Unit 1)

On March 27, 1988, the Main Feedwater Control System malfunctioned causing the main feedwater regulating valve to close followed by a low steam generator level and a reactor trip. The root cause of the event was attributed to failure of the feedwater regulating valve positioner causing the valve to overshoot its pre-set position on the closing stroke. The inspector reviewed the following records relative to troubleshooting and repair of the valve positioner:

- LER 335-88-03 dated April 27, 1988
- Completed PWO 7096
- Completed I&C Procedure 1-1400173, R0, Feedwater Regulating System Verification

c. Recurring Safety-Related Equipment Failures

(1) Charging Pump Packing

Through-out plant life, charging pump packing failure has been a recurring problem. In early 1984, a Quality Improvement Project (QIP) was initiated to study the problems with packing failures and recommend measures to improve the life of the packing. The QIP team determined that packing design accounted for greater than 70% of the charging pump packing failures. Prior to 1985, the average packing life had been 300 - 400 hours. A new packing design was tried in charging Pump 2B. The trial period ended March 23, 1985, after a successful run of 2465 hours. PC/M's 032-185, (Unit 1) and 219-84 (Unit 2) were issued to change the packing in all charging pumps to the new design packing. The number of charging pump repacks per year has decreased from 43 in 1984 to eight in 1987. The inspector reviewed the following records and documents relative to charging pump packing:

- Charging Pump QIP Report
- Charging Pump Packing Replacement History
- Completed PWO's 2630 (Unit 2), 2870 (Unit 2), 2707 (Unit 1), and 3238 (Unit 1)
- Completed Procedures GM 1-M-0041, R9 and 2-M-0041, R6 for PWOs 2870 and 2630
- Completed Post Maintenance Test Forms - Appendix B to QI 11-PR/PSL-2 for PWOs 2870 and 2630



(2) Reactor Coolant Pump (RCP) Seals

Because of recurring problems with RCP seals requiring seal changeouts, in May of 1985, a QIP team was formed to investigate the performance of RCP seals. The QIP team found that unplanned outage days had totaled 82 due to RCP seal failures. The team identified the following causes of RCP seal failure:

- A loss of Component Cooling Water (CCW) was found to be responsible for 78% of the seal failures causing unplanned days off line. Analysis indicated that the root cause for loss of CCW to the RCP seals was the inability to open the RCP Seal Heat Exchanger CCW Valves if they close.
- Problems were also identified with RCP seal venting. The creation of back pressure on seals will cause an internal U-cup to become displaced.
- The RCP Seal Flow Test had never exposed a problem and was suspected to have caused seal problems.

The following changes were made due to the QIP teams study:

- PCM's 133-185 and 009-286 were implemented to change the logic of the air and solenoid operated valves that control the CCW from the Seal Heat Exchanger. The valves will now fail open if either electrical power or instrument air is lost. Control room personnel can override in the event of automatic actuation.
- Procedures were revised in the area of filling and venting to reduce the possibility of creating a back pressure on any of the stages, thereby, reducing premature failures.
- Installation of local pressure gauges will allow plant personnel to more accurately determine if RCP seals are showing signs of failing.
- The RCP Seal Flow Test has been eliminated.
- Procedures for removal, installation, and rebuilding of RCP seals have been reviewed and revised where necessary.
- RCP seal history was established.

Since implementation of the above changes the number of seal changeouts has been reduced significantly. In 1985, seven seals in Unit 2 and two seals in Unit 1 were changed out. The average seal life was approximately 16 months for Unit 1 and eight months for Unit 2. No seal changeouts occurred in 1986. In 1987, a total of four seal changeouts occurred, three in Unit 1 and one in Unit 2. Two of the Unit 1 seals were changed due to the length

of service (5 and 5-1/2 years). The third Unit 1 changeout was because of a broken pipe nipple welded to the RCP seal flange. The Unit 2 changeout resulted from pressure fluctuations. In 1987, the average lifetime of RCP seals had increased to approximately 21 months for Unit 1 and 13 months for Unit 2.

The following records and documents relative to RCP seals were reviewed:

- RCP Seal QIP Report
- Completed PWO's 3514 (Unit 1), 3583 (Unit 1), 3516 (Unit 2), and 3345 (Unit 2)
- Completed GM Procedures M-008 and M-009 for the above PWO's
- Completed Post-Maintenance Test Forms - Appendix B to QI 11-PR/PSL-2 for the above listed PWO's
- Byron Jackson Technical Manual for Reactor Coolant Pump B.J. No. 681-N-00445/48, R7
- Byron Jackson Technical Manual for Reactor Coolant Pump No. 741-N-0001/4

d. The following maintenance procedures associated with the maintenance activities of Paragraphs a., b., and c. above were reviewed:

- GM M-0039, R6, Threaded Fasteners of Closure Connections on Pressure Boundaries and Structural Steel
- GM M-0041, R6, Charging Pump Maintenance
- GM M-009, Reactor Coolant Pump Seal Installation
- GM M-008, Reactor Coolant Pump Seal Removal

The procedures and associated PWO's were reviewed in the areas of:

- Conformance to licensee's administrative requirements
- Post-maintenance testing appropriate for repairs made
- Inspection and hold points identified
- Supplementary reference material adequate and controlled
- Activity described in sufficient detail
- Consideration given to radiological and environmental hazards as appropriate

- Provisions for fire protection, cleanliness and house-keeping
 - Provisions for obtaining approval from operations
- e. Qualification/certification and/or training records were reviewed for a sample of maintenance and QC personnel involved in the maintenance activities discussed in Paragraphs a., b., and c. above. Records for the following were reviewed:
- Three QC Inspectors in the area of Mechanical Maintenance
 - Two I&C Technicians
 - Six Mechanical Maintenance Journeymen
- f. Measuring and Test Equipment (M&TE) records for the following equipment were reviewed for the following equipment used in the maintenance activities of Paragraphs a., b., and c. above:

- PSL 473 - Transmation Calibrator
- PSL 560 - Transmation Calibrator
- PSL 116 - Transmation Calibrator
- PSL 117 - Transmation Calibrator
- PSL 663 - Keithley Meter
- PSL 610 - Pen Recorder
- M-114 - Torque Wrench
- M-27 - Torque Wrench
- M-123 - Torque Wrench
- M-116 - Torque Wrench
- M-39 - Torque Wrench
- M-145 - Torque Wrench

The records were reviewed to verify that the equipment was in calibration at the time of use.

- g. In review of the above records, the inspector identified a problem with records for Post Maintenance Testing and Inservice Testing (IST). The front sheet of the PWO form has blocks to mark "yes" or "no" for Post-Maintenance Testing and IST. Required testing is identified on Appendix B of QI-PR/PSL-2. Appendix B is part of the PWO package and QI PR/PSL-2 is referenced on the PWO. The inspector found inconsistencies in specifying the requirements on the PWO form and Appendix B to QI PR/PSL-2. In some cases, the PWO form would indicate that IST was not required, yet Appendix B would specify IST requirements. In one case Appendix B specified IST and no sign offs on the form indicated testing was accomplished (per code requirements, IST was not required for this case). The Appendix B form contain both Post-Maintenance Testing and ASME code IST. In one case, an equivalent Post-Maintenance Test was specified in lieu of an ASME code IST. (The tests were identical for this case). Investigation of these inconsistencies revealed the following:



- The PWOs containing the inconsistencies were not current PWO's. A number of current PWO's were reviewed and similar inconsistencies were not present.
- In all cases where inconsistencies existed, the required tests were conducted in spite of the inconsistencies.
- Prior to the inspection, the licensee had identified the problem and was in the process of revising PR/PSL-2 to clarify requirements for Post Maintenance-Testing and IST.
- In addition to revision of PR/PSL-2, the licensee found that planners, who prepare PWOs, did not previously have a clear understanding of the difference in Post-Maintenance Testing and IST. Requirements have been clarified to planners. In addition, currently, testing requirements for all equipment has been entered on the Total Equipment Data Base (TEDB) which is being used by the planners to identified required testing.

Based on the above, Inspector Followup Item 335, 389/88-09-01, Clarification of Requirements for Post Maintenance Testing and IST, is identified to review the revised procedures during a future inspection.

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

6. Inservice Inspection Data Review and Evaluation (Unit 2) (73755)

The inspector reviewed the ISI NDE records indicated below to determine whether the records were consistent with regulatory requirements and licensee procedures. The appreciable code is the ASME Boiler and Pressure Vessel (M&PV) Code, Section XI, 1980 Edition, Winter 1980 Addenda.

The Unit 2 "1987 ISI Summary Report", document No. MCI-PSL-200-003, was submitted on February 19, 1988 (FP&L Letter L-88-87). The report was reviewed by the inspector for completeness, clarity and compliance with Article IWA-6000 of ASME B&PV Code Section XI.

The following NDE records for the 1987 outage were reviewed:

	<u>Weld No.</u>
- Liquid Penetrant (PT)	- 6" - 112 - 7 - SW - 3
	- 24" - CS - 2 - FW - 5
	- 24" - CS - 2 - FW - 5A
	- 12" - SI - 458 - FW - 3



- Ultrasonic (UT)
 - 105 - 651
 - 79 - 1 - SW - 2
 - MS - 120 -FW - 1
 - 30" - 401 - 258 - B
 - 30" - 115 - 1
 - 30" - 115 - 2
 - 30" - 109 - 742 - A
 - 30" - 109 - 742 - B
 - 30" - 107 - 722 - A
 - 30" - 107 - 722 - B
 - 30" - 103 - 742 - A
 - 30" - 103 - 742 - B

- Magnetic Particle (MT)
 - 79 - 1 - SW - 3
 - BF - 14 - SW - F3

These records were reviewed to ascertain whether NDE records contained or provided reference to:

- Examination results and data sheets.
- Examination equipment data.
- Calibration data sheets
- Examination evaluation data
- Records on extent of examination.
- Records on deviation from program and procedures including justification for deviation, if applicable.
- Re-examination data after repair work, if applicable.
- Identification of NDE materials such as penetrant, penetrant cleaner, couplant, films, tapes, etc.

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

7. Inspector Followup Items (IFI's) (92701) (Units 1 and 2)

- a. (Closed) IFI 389/86-24-02, Revision of Valve Stroke Testing Frequency Requirements. This item pertained to the fact that Data Sheet 8 of Procedure 0010125, used to schedule testing of valves to be stroke tested quarterly, did not preclude test frequencies exceeding Technical Specification limits for individual valves. Data Sheets 8A, 8B, and 9 now require that some valves be tested in the first half of the month and the rest of the valves be tested in the second half of the month. This resolves the above discussed procedure problem.

- b. (Closed) IFI 335/86-25-01, 389/86-24-01, Review of Revised Welding Program. At the time that this item was opened, a number of weaknesses were identified in the licensee's program for maintenance and backfit. The licensee had organized a Welding Improvement Team to correct known weaknesses and formulate a welding program suitable for all entities. All known weaknesses have been corrected.

The welding team is in the process of reorganizing to make further improvements and refinements in the Welding program.