



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

Report Nos.: 50-250/85-19 and 50-251/85-19

Licensee: Florida Power and Light Company
9250 West Flagler Street
Miami, FL 33101

Docket Nos.: 50-250 and 50-251

License Nos.: DPR-31 and DPR-41

Facility Name: Turkey Point 3 and 4

Inspection Conducted: June 3 - 10, 1985

Inspectors: *P. A. Taylor* *6/28/85*
for H. L. Whitener Date Signed

Accompanying Personnel: S. Q. Ninh

Approved by: *P. A. Taylor* *6/28/85*
for F. Jape, Section Chief Date Signed
Engineering Branch
Division of Reactor Safety

SUMMARY

Scope: This routine, unannounced inspection entailed 136 inspector-hours on site in the areas of witnessing the containment integrated leak rate testing (ILRT) including review of local and integrated leak rate test procedures, review of test data and preliminary data analysis, independent analysis of test results, and verification of a sample of valve alignments in the plant.

Results: No violations or deviations were identified.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*C. J. Baker, Plant Manager
J. W. Kappes, Maintenance Superintendent, Nuclear
*B. Abrishami, System Performance Supervisor
*R. Gouldy, Senior Engineer
W. Lighfoot, Performance Test Coordinator
*K. Remington, System Performance Test Engineer
E. Dill, Assistant Engineer
R. Hart, Licensing Engineer

Other Organizations

Stone and Webster

B. C. Kuechler, Leak Rate Consultant
R. J. Parry, Engineer
J. L. Busa, Engineer
J. L. Barnes, Engineer

NRC Resident Inspectors

T. Peebles, Senior Resident Inspector
*R. Brewer, Resident Inspector

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on June 10, 1985, with those persons indicated in paragraph 1 above. The inspector described the areas inspected and discussed in detail the inspection findings. The licensee did not identify as proprietary any of the materials provided to or reviewed by the inspectors during this inspection.

Inspector Followup Item (IFI) 250/85-19-01 paragraph 5b - Revise Operating Procedures (OP) 13100.1, 13100.2 and 13404.1 for the following changes: (1) to incorporate appropriate acceptance criteria for a short duration test, (2) included controls for draining penetrations and (3) require leak testing of the rotometer bypass valve on the local leak rate test rig.

Since these operating procedures are for both Unit 3 and Unit 4 correction of these areas for Unit 3 will also correct these conditions for Unit 4.

The inspector acknowledged that based on the review of preliminary test results the leakage rate of the Unit 3 containment meets the acceptance limits of Appendix J to 10 CFR 50.

3. Licensee Action on Previous Enforcement Matters

This subject was not addressed in the inspection.

4. Unresolved Items

Unresolved items were not identified during the inspection.

5. Containment Integrated Leak Rate Test - (61719)(Unit 3)

The inspector reviewed and witnessed test activities to determine that the primary containment integrated leak rate test was performed in accordance with the requirements of Appendix J to 10 CFR 50, ANSI N45.4 and test Operating Procedures 13100.1, "Integrated Leakage Rate Test", and 13100.2, "Valve Line-Up For ILRT."

Selected sampling of the licensee's activities which were inspected included: (1) review of the test procedures to verify that the procedures were properly approved and conformed with the regulatory requirements; (2) observation of test performance to determine that test prerequisites were completed, special equipment was installed, instrumentation was calibrated and appropriate data were recorded; and (3) preliminary evaluation of leakage rate test results to verify that leak rate limits were met.

Pertinent aspects are discussed in the following paragraphs.

a. General Observations

The inspector witnessed and reviewed portions of the test preparation, containment pressurization, temperature stabilization and data processing during the period of June 3 - 10, 1985. The following items were verified on a sample basis:

- (1) The test was conducted in accordance with an approved procedure. Procedure changes and test discrepancies were properly documented in the procedure.
- (2) Test prerequisites selected for review were found to be completed.
- (3) Plant systems required to maintain test control were reviewed and found to be operational.
- (4) Special test instrumentation was reviewed and found to be installed and calibrated.
- (5) Data required for the performance of the containment leak rate calculations were recorded at 15-minute intervals.

- (6) Problems encountered during the test were described in the test event log.
- (7) Pressurized gas sources were properly isolated and vented to preclude in-leakage or interference of out-leakage through containment isolation valves.
- (8) Procedure valve alignment was reviewed against system drawings to verify correct boundary alignment, and venting and draining of specific systems.
- (9) Temperature, pressure, humidity, and flow data were recorded at 15-minute intervals. Data were assembled and retained for final evaluation and analysis by the licensee. A final ILRT report will be submitted to the Office of Nuclear Reactor Regulation.

No violations or deviations were identified in the above review.

Subsequent to the procedure review in item (8) above, the inspectors selected a sample of containment penetrations and walked down each penetration to verify that the valves were tagged and positioned in accordance with the procedure valve alignments for the Type A test as specified in OP 13100.2. Penetrations included in the field verification included:

<u>Penetration No.</u>	<u>Title</u>
5	Pressurization Relief Tank to Gas Analyzer
6	Nitrogen Supply to Pressurize Relief Tank
7	Primary Water to Reactor Coolant System
20	Reactor Coolant System Sample
24A	Seal Water to Reactor Coolant Pump A
24B	Seal Water to Reactor Coolant Pump B
24C	Seal Water to Reactor Coolant Pump C
25	Seal Water Return
47	Primary Water to Containment Decontamination Area

During the field verifications the inspectors also observed the local leak rate test on the containment personnel airlock.

No problems were identified during the field inspection; however, a potential problem in performance of local leak rate tests was identified while observing the airlock test. This matter is discussed in paragraph 5.b.(2).

b. Test Procedure Review

(1) Type A Test Procedure - Unit 3 and Unit 4 (61719)

The inspector reviewed OP 13100.1, "Integrated Leakage Rate Test," and portions of OP 13100.2, "Valve Line-Up for ILRT," revised May 24, 1985, to verify that adequate test controls, acceptance criteria and valve alignments were specified. No problems were identified in this review with the exceptions of verification of the venting and draining process and the acceptance criteria for a short duration test. These matters were discussed with the licensee and resolved as follows:

(a) Venting and Draining

The valve line-up procedure OP 13100.2 specifies the Type A test valve positions for the penetrations but does not specify any sequence for positioning these valves. Consequently, if isolation valves were closed prior to opening drain valves, there is a potential that a penetration may remain water sealed. The licensee stated that penetrations are verified to be drained during Type C testing. A recheck of all penetrations not Type C tested or returned to service after Type C testing was performed prior to the Type A test. No problems were identified. The licensee stated that procedural control for draining will be established prior to the next Type A test.

(b) Short Duration Test Criteria

The licensee performed a short duration Type A test in accordance with an NRC staff approved procedural methodology defined in Bectel Topical Report, "BN-TOP-1, Revision 1 - November 1972". One criterion in BN-TOP-1, Rev. 1, for termination of the Type A test in less than 24 hours, requires that the total time 95% upper confidence limit (UCL) shall be less than the maximum allowable leak rate (L_a) based on Total Time analysis of the data. Subsequent to the NRC's acceptance of BN-TOP-1, Rev. 1, on January 15, 1973, Appendix J to 10 CFR 50 was issued on February 14, 1973. Appendix J establishes the acceptance limit for a Type A leak rate test as less than $0.75 L_a$. This value is also incorporated in the plant Technical Specifications. While the

methodology of BN-TOP-1, Rev. 1 for monitoring sensors and evaluating test data to determine that the data accumulated for less than a 24 hour duration has sufficient stability and consistency on which to base the final leak rate calculation is acceptable to the NRC, the 95% UCL leak rate calculated by Total Time analysis must meet the legal acceptance limit for Type A tests of 0.75 La specified in the Federal Regulation (Appendix J to 10 CFR 50) and plant Technical Specifications. The 95% UCL met the 0.75 La limit prior to termination of the test.

(2) Type B and Type C Test Procedure - Unit 3 and Unit 4 (61720)

The inspectors reviewed portions of OP 13404.1, "Local Leak Rate Tests" to verify that adequate test controls, acceptance criteria and valve alignments are specified. The inspectors found that the procedure contains adequate instruction and detail for performance of local leak rate testing including: identification and verification of valve positions for test connections, vent paths, block valves, isolation valves, removal of valve caps and post test system restoration.

One weakness identified in the test procedure pertains to leak testing the test rig used in performing the leak rate tests. One feature incorporated into the test rig is a bypass valve which allows the airflow to bypass the rotometers in order to rapidly pressurize the test volume. When the test volume is pressurized the bypass valve is closed and the airflow is directed through the rotometers to measure the amount of airflow necessary to maintain test pressure. The procedure contains no requirement to leak test the bypass valve in order to ensure that all airflow to the test volume is through the rotometers. Any leakage through the bypass valve would yield a nonconservative test result. Discussions with the leak rate test personnel indicated that the bypass valve is frequently leak tested but is not formally documented. The licensee agreed to revise the procedure to document these tests.

Licensee management was informed that revision to the test procedures would be identified for followup inspection as:

IFI (250/85-19-01): Review Operating Procedures 13100.1, 13100.2 and 13404.1 to verify that appropriate acceptance criteria for a short duration test, controls for draining penetrations and leak testing of the test rig bypass valve have been incorporated into the test procedures.

c. Test Performance - Unit 3

(1) Method

The licensee has developed data analysis capability for Total Time analysis in accordance with the requirements of BN-TOP-1, Revision 1, for a short duration test and Mass Point-Linear Regression analysis in accordance with the recommendations of ANSI/ANS N56.8-1981 for a 24-hour test. The Appendix J acceptance limit of 0.75 La was met for the 95% UCL for both the Total Time and Mass Point analysis techniques. A supplemental test was performed in accordance with the specifications of Appendix C to ANSI N45.4 - 1972 and BN-TOP-1, Revision 1 - November 1972.

(2) Test Description

The absolute method as defined in ANSI N45.4-1972 was used in determining the containment leakage rate. Values bounding the test conditions were as follows:

Containment Volume	1.55 x 10 ⁶ cubic feet
Accident Pressure (Pa)	49.9 Psig
Maximum Allowable Leakage La	0.25 wt.% per Day

System conditions for performance of the integrated leak rate test were as follows:

- (a) Reactor Vessel - Water level at mid-nozzle level and vented to the containment
- (b) Steam Generators - One partially drained, two water filled
- (c) RHR System - Operating in shutdown cooling mode
- (d) Containment Fans - Secured - air circulation was provided by four auxiliary fans
- (e) Instrumentation - Instruments which are exposed to containment pressure post accident were exposed to test pressure
- (f) Pressurized Gas Source-Isolated and vented to atmosphere

Containment pressurization was initiated at 2:07 a.m. and terminated at 11:02 a.m. on June 7, 1985, with the containment air pressure at 67.92 psia. Temperature stabilization criteria were met at 8:15 p.m. on June 7, 1985, and time zero for the integrated leak rate test was declared. At 2:00 a.m. on June 8, 1985, a significant change in the mass data trend occurred. Review of the test parameters showed that the humidity detector output was not

stabilized when the test was started. Time zero for the test was reset at 2:00 a.m. June 8, 1985. At about 7:30 a.m. another perturbation occurred in the trend of mass data. Investigation indicated that containment air temperature was affected when temperature of the RHR heat exchanger cooling water supply was changed. Time zero was reset to 8:30 a.m. and the test was concluded at 4:30 p.m. on June 8, 1985. A supplemental test was performed from 5:30 p.m. to 9:30 p.m. June 8, 1985.

c. Test Results - Unit 3

(1) Type A Test

The Technical Specification allowable leakage (L_a) for Turkey Point 3 is 0.25 wt.% of the containment volume at accident pressure (P_a) per day. The acceptable test leak rate limit of $0.75 L_a$ is therefore 0.1875 wt% per day. The calculated leakage rate and 95% UCL for the Total Time and Mass Point Analysis are shown below for the eight hour test period of 8:30 a.m. to 4:30 p.m., June 8, 1985:

	<u>Mass Point</u>	<u>Total Time</u>
Leak Rate	0.06 wt.%/day	0.045 wt.%/day
UCL	0.07 wt.%/day	0.142 wt.%/day

These values are below the acceptance limit of 0.1875 wt.%/day.

(2) Supplemental Test

A four hour supplemental test was performed in accordance with Appendix C of ANSI N45.4-1972 and the BN-TOP-1, Revision 1 criteria. The measured composite leak rate was within the upper and lower acceptance limit specified by the equation $L_{am} + L_o - 0.25L_a \leq L_c \leq L_{am} + L_o + 0.25L_a$ for both the Mass Point and Total Time analysis as indicated below:

Mass Point
0.253 wt.% \leq 0.357 wt.% \leq 0.378 wt.%
Total Time
0.238 wt.% \leq 0.345 wt.% \leq 0.363 wt.%

These values meet the requirements of Appendix J.