UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30303

Report Nos.: 50-250/84-20 and 50-251/84-20

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 Date: May 29 - June 1, 1984

Inspection at Turkey Point site near Homestead, Florida

Inspector: K. E. Davenport — Date Signed: 12 June 84

Approved by: F. Jape, Section Chief, Engineering Branch, Division of Reactor Safety — Date Signed: 12 June 84

SUMMARY

Scope: This routine, unannounced inspection involved 32 inspector-hours on site in the areas of initial criticality following refueling, zero power physics tests, and open item followup.

Results: No violations or deviations were identified.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*C. J. Baker, Plant Manager
*J. W. Knapps, Maintenance Superintendent
*E. F. Hayes, Instrumentation and Control Supervisor
*M. J. Crisler, Quality Control Supervisor
*J. A. Labarraque, Technical Department Supervisor
*J. Arias, Regulation and Compliance Lead Engineer
*K. Jones, Operations QA Supervisor
*D. Grandage, Plant Engineering Supervisor
*V. Kaminskas, Reactor Supervisor
*R. G. Mende, Reactor Engineer
*D. Tomaszewski, Technical Support Engineer

Other licensee employees contacted included two operators.

NRC Resident Inspectors

*T. A. Peebles
*D. R. Brewer

*Attended exit interview.

2. Exit Interview

The inspection scope and findings were summarized on June 1, 1984, with those persons indicated in paragraph 1 above. The licensee was informed of inspection findings listed below and acknowledged the inspection findings without significant comment.

Inspector Followup Item 250, 251/84-20-01: Initial Criticality and Nuclear Design Check Tests Procedure, paragraph 5. b. and c.

3. Licensee Action on Previous Enforcement Matters

Not inspected.

4. Unresolved Items

Unresolved items were not identified during this inspection.

5. Initial Criticality - Unit 4, Cycle 10

Portions of procedure 0204.3, Initial Criticality after Refueling, were witnessed and results were verified by the inspector.

The purpose of the procedure was to:

a. Achieve Initial Criticality

Initial criticality was achieved for Unit 4, cycle 10 on May 29, 1984, at 3:36 a.m. During the approach to criticality, shutdown rod banks A and B, (SBA and SBB), were withdrawn in normal sequence. Rod withdrawal continued until Bank D was approximately 160 steps withdrawn. Dilution was initiated and critiality was achieved with Bank D at 207 steps withdrawn with a boron concentration of 1830 ppm.

b. Establish an Upper Limit of Neutron Flux for Zero Power Physics Measurements

The point of nuclear heating was determined by initiating a flux increase. The point of nuclear heat was evaluated by relating flux at the point of Tavg departure to initial flux. This fractional increase was used to ratio all other flux indicators to the point of heating value. The point of nuclear heating was established as the upper value of neutron flux for physics testing. Step A.8 provides the option of performing physics testing at or above the point of adding heat. Doppler feedback corrections would have to be applied to the measurements if taken in the nuclear heating range. At this time, there is no approved methodology for determining correction factors, therefore, this option cannot be used and a margin between the point of adding heat and the testing range needs to be established. This will be identified as Inspector Followup Item (IFI), 250, 251/84-20-01.

c. Verify Proper Operation of the Reactivity Computer

The reactivity computer checkout was performed by determining a calibration factor from the average value of delta pcm (design) delta pcm (measured) using the reactor period. The procedure lacked instructions for performing the positive and negative reactivity changes. The licensee indicated that the actual method used would be incorporated into the procedure. This item will be followed during resolution of IFI 250, 251/84-20-01.

No violations or deviations were identified.

6. Nuclear Design Check Tests, Unit 4, Cycle 10 (72700, 61702, 61708, 61710)

Procedure 0204.5, Nuclear Design Check Tests During Startup Sequence After Refueling, prescribes the order in which various cycle 10 physics tests are performed and contains the procedure for accomplishing the tests. Those

appendices which were witnessed and had the test results reviewed by the inspector are as follows:

a. Boron Endpoint Measurement (C_B)

To determine the all rods out (ARO), boron concentration, Bank D was fully withdrawn. Observed changes in reactivity and adjusted boron concentration were recorded and utilized to determine C_B in the equation:

$$C_B \text{ (end point)} = C_B \text{ (just critical)} + \text{delta pcm } \frac{(\text{delta } C_B)}{(\text{delta pcm})}$$

The measured ARO boron concentration was calculated to be 1832 ppm which met the acceptance criteria of being within ±100 ppm of the predicted ARO boron concentration of 1804 ppm.

b. Moderator Temperature Coefficient (MTC), Isothermal Temperature Coefficient (ITC)

The ITC was determined by establishing an RCS constant heatup/cooldown rate of approximately 10°F/hr. When the moderator temperature has increased/decreased approximately 5°F, the change in temperature and associated change in reactivity were used to first calculate the ITC. The equation MTC=ITC-Doppler coefficient, was then used to determine the MTC which was found to be 5.93 pcm/°F. This value did not meet the acceptance criteria of being less than or equal to 5 pcm/°F. Boron concentration was therefore limited to the value given in Figure 6A, estimated critical condition section of the plant curve book as per the note associated with Step 8.12.3. Step 8.12.3, the sign off for the acceptance criteria, does not clearly delineate whether the test results met the acceptance criteria. The licensee was requested to consider revising Step 8.12.3 to reflect successful or unsuccessful test results and to clearly state that Figure 6A be adhered to under conditions where the test results met the acceptance criteria or not. This will be addressed during resolution of IFI 250, 251/84-20-01.

c. Low Power Flux Map

A flux map was acquired using operating procedure 12404.1 which utilized the movable incore detectors. Two problems arose from the analysis of the maps.

(1) Two symmetric rod locations were indicating larger than predicted deviations from the design data. This was determined to be a result of the flux map tubing being reversed at the seal table. I&C is scheduled to perform corrective maintenance during the next cold shutdown.

(2) Peaking factors on the "flats" around the core were showing larger than predicted deviation from design data. This was due to inaccurate Westinghouse computer code modeling. Westinghouse modified the code to more accurately reflect core conditions and sent the new design parameters to Reactor Engineering at Turkey Point.

d. Rod Worth Verification by Rod Swap Method

The rod worth of the reference bank for the rod swap tests, SBA, was determined by establishing a reactivity change of about 500 pcm/hr. Periodic rod movements were made to compensate for the change in reactivity. The test results indicated that the measured value of 1231 pcm was within the design tolerance of 1283 for SDA±10%.

The integral rod worths for control banks A, B, C, D, and SBB, were determined using the rod swap method. The reference bank, SBA, was interchanged with the selected test bank by making incremental step insertions and withdrawals.

The measured reactivity worth of control banks A, B, C, D and SBB met their respective acceptance criteria by being within ±10% of the design value.

Appendix G which was used in the rod swap determination does not clearly define the measured and calculated parameters. The licensee is considering a revision to clarify this issue. This will be addressed during resolution of IFI 250, 251/84-20-01.

No violations or deviations were identified within the areas inspected.

7. Inspector Followup Item (92706)

Open items were reviewed to determine that appropriate corrective action was taken. The inspection consisted of records review and discussions with licensee personnel. The following items are closed.

250, 251/79-07-01	DEF	Failure to Certify or Recertify Personnel Performing Leak Testing as Required by QP-9.2 which Implements FPL-TQAR Sec. 9.0 which Implements Crit. IX, Appdx B, 10 CFR 50
250, 251/82-34-01	IFI	Provide a Formalized Method of Tracking Procedural and Programmatic Changes Associated with Technical Specification Changes
250, 251/83-05-01	IFI	Incorporation of QC Inspectors Pre-Review Checklist into Plant Procedures
250, 251/83-24-02	IFI	Administrative Controls on Use of Lead Seals for Fixing Valve Positions

250, 251/83-26-05	IFI	Modify Test Sequence of OP 14004.1 to Reduce Possibility of Spurious Reactor Trips.
250, 251/83-26-06	IFI	Revise 4303.1 EDG-Normal Standby Condition

No violations or deviations were identified within the areas inspected.