



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

Report Nos.: 50-250/87-34 and 50-251/87-34

Licensee: Florida Power and Light Company
9250 West Flagler Street
Miami, FL 33102

Docket Nos.: 50-250 and 50-251

License Nos.: DPR-31 and DPR-41

Facility Name: Turkey Point 3 and 4

Inspection Conducted: July 29 - August 1, and August 26 - September 1, 1987

Inspectors: *P. T. Burnett* 9/29/87
P. T. Burnett Date Signed

S. G. Tingen 9/30/87
S. G. Tingen Date Signed

Approved by: *Frank Jape* 9/30/87
F. Jape, Section Chief Date Signed
Engineering Branch
Division of Reactor Safety

SUMMARY

Scope: This routine, unannounced inspection was conducted in the areas of review of post-refueling startup tests and followup of open items.

Results: No violations or deviations were identified.

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REPORT DETAILS

1. Persons Contacted

Licensee Employees

- *C. J. Baker, Plant Manager
- J. Arias, Jr., Regulatory and Compliance Supervisor
- *W. Bladow, Quality Assurance Superintendent
- *D. Grandage, Operations Superintendent
- V. A. Kaminskas, Reactor Engineering Supervisor
- *M. O. Kulp, Project Engineer
- G. Marsh, Reactor Engineer
- P. Salkeid, Plant Supervisor - Nuclear
- *G. Salomon, Compliance Engineer
- *E. A. Saurez, Engineer, Technical Department
- *D. J. Tomaszewski, Instrument and Controls Supervisor
- *V. Wager, Licensing Engineer
- *D. R. Whitney, Compliance Engineer
- *T. Young, Project Site Manager

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

NRC Resident Inspectors

- *D. R. Brewer, Senior Resident Inspector
- *J. B. Macdonald, Resident Inspector

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on September 1, 1987, with those persons indicated in paragraph above. The inspector described the areas inspected and discussed in detail the inspection findings. No dissenting comments were received from the licensee. Proprietary information was reviewed during the inspection, but is not included in this report. The following new item was identified during this inspection:

- UNR 250, 251/87-34-01: Provide test results for post-modification tests in response to IEB 80-06, paragraph 10.

3. Licensee Action on Previous Enforcement Matters

This subject was not addressed in the inspection.

4. Unresolved Items

Unresolved items are matters about which more information is required to determine whether they are acceptable or may involve violations or deviations. One new unresolved item identified during this inspection is discussed in paragraph 10.

5. Post-Refueling Startup Test - Unit 4 (72700, 61708, 61710)

The following completed startup test procedures were reviewed:

- a. OP 0204.3 (7/31/86), Initial Criticality after Refueling, was begun on 8/17/86 and completed on 8/18/86. With an initial boron concentration of 2080 ppm, shutdown and then control banks were withdrawn in 50 step increments until D bank was at 160 steps. The inverse count rate ratio (ICRR) was calculated and plotted for each increment. The final ICRR for the source range was 0.402. The ICRR was renormalized to 1.0 and dilution was continued at the rate of approximately 50 gpm until the ICRR reached 0.103 on the source range, at which point dilution was secured.

Prior to pulling rods, both source range channels were tested for operability using the chi-squared test. The inspector independently verified the analyses from the raw data. Both systems were well behaved.

The actual initial critical conditions were not recorded in the procedure. However, the boron concentration log maintained as part of OP 0204.5 indicates that at 0705 on 8/18, D bank was at 120 steps with an RCS CB of 1890 ppmB. Apparently, dilution overshot criticality by 40 steps on D bank (about 160 pcm).

Nuclear heating flux level was determined.

The reactivity computer was checked out. Reactivities determined from stop-watch period agreed with the reactivity computer within 2.3%.

- b. OP 0204.5 (7/31/86), Nuclear Design Check Tests During Startup after Refueling, was begun on 8/18/86. The measured all-rods-out (ARO) boron concentration was 1811 ppmB and differed from the predicted value (WCAP 11027) of 1864 by more than 50 ppmB, thus not satisfying the acceptance criterion. (Actually, the agreement was much worse until the boron samples were reanalyzed.) The result was evaluated by Westinghouse in a letter dated August 20, 1986, as being acceptable with no adverse safety implications.

The isothermal temperature coefficient for ARO was measured to be +3.205 pcm/F on heatup and +2.14 pcm/F on cooldown. The average was corrected for a doppler coefficient of -1.830 pcm/F yielding a moderator temperature coefficient of +4.56 pcm/F, which is close to



the Technical Specification 3.1.2.1 limit of +5.0 pcm/F. A repeated measurement yielded a MTC of 3.33 pcm/F, and a third measurement gave 4.502 pcm/F. No measurement with one rod bank inserted was performed.

Step 8.13.4 was signed off as confirming by virtue of the zero power coefficient that the coefficient at 100% power, xenon-free, will be less than or equal to zero, but no confirming analysis was presented or referenced.

Control rod worths were determined by rod swap. The reference bank was bank C, which had a measured worth against boron dilution of 1441 pcm (the integral worth to step 22 was 1402, and the balance was obtained from the endpoint measurement) compared with a predicted value of 1427 pcm. The remaining bank worths were determined by rod swap and ranged from 1.3 to 9.1% less than prediction. The total rod worth was only 2.5% less than predicted.

Using data obtained above, the boron worth was calculated to be 8.73 pcm/ppmB; very slightly more than predicted. Again, this value is after the reanalysis of the boron concentrations.

The inspector reviewed the strip chart records from the reactivity computer for the C bank measurement and independently confirmed the differential and integral worth curves. In comparing results of the differential worth distributions, one arithmetic error was discovered in the licensee's calculations. That error had no effect on the integral worth or the acceptance criteria. Attachment 1 is a graphical display of the differential worth curves determined by the inspector and the licensee (after correction).

6. Core Power Distribution Monitoring (Unit 4) (61702)

The inspector reviewed the completed copies of operating procedure 12404.1, Normal Operation of Incore Moveable Detector System and Power Distribution Surveillance, for the ten full-core flux maps performed during cycle 11 of operation. In all cases, the hot channel factors of Technical Specification 3.2.6.a were satisfied as was the quadrant power tilt limit of Technical Specification 3.2.6.h. The test frequency satisfied the requirements of Technical Specification table 4.1-1 item 1.b.

Technical Specification 3.2.7.a requires a minimum of 16 incore detectors thimbles, with at least two per quadrant, be mapped for the surveillance. That requirement was satisfied in all cases. In addition, the licensee has developed a system of conservative penalty factors to be applied to the hot channel factors whenever the number of thimbles is less than 38.

No violations or deviations were identified.



7. Post-Refueling Startup Tests - Unit 3 (72700)

Startup of Unit 3 was delayed by equipment problems. However, the inspectors witnessed portions of the control rod drop measurements being performed under the guidance of procedure 3-PMI-028.3, RPI Hot Calibration, CRDM Stepping Test, and Rod Drop Test. The personnel performing the test appeared to be in verbatim compliance with the procedure requirements. In preparation for reviewing test results, the inspectors reviewed WCAP-11454, the Nuclear Design and Core Management of the Turkey Point 3 Power Plant Cycle 11, (PROPRIETARY).

Some time was also spent to reviewing the Unit 3 main control board and discussing startup operations with the operations crew.

Procedure 3-OSP-049.1, Reactor Protection System Logic Test, was also reviewed and compared satisfactorily with the requirements of Technical Specification Table 3.5-1.

Other procedures reviewed included:

- a. Operating Procedure 4004.2, Safeguard Relay Rack Train A, B, - Periodic Test, and;
- b. 3-OSP-041.1, Reactor Coolant System Leak Rate Calculation.

No violations or deviations were identified.

8. Thermal Power Monitoring (61706)

Collection of the necessary plant-specific parameter data required to use the microcomputer program TPDWR2 at Turkey Point was begun. The program is described in NUREG-1167, TPDWR2: Thermal Power Determination for Westinghouse Reactors, Version 2.

Review of the licensee's heat balance procedure contained in 3/4-OSP-059.5, Power Range Nuclear Instrumentation Shift Checks and Daily Calibrations, revealed that the licensee uses average values of steam generator flows, pressures, and feedwater temperatures instead of calculating the power produced in each generator separately as is done in TPDWR2 and by all other licensees surveyed to date.

This inspection project will be completed during the next inspection, and the significance of the licensee's methodology assessed at that time.

9. Followup of Open Items (92701)

(Closed) Inspector Followup Item 251/84-27-01: Reactor coolant system leakrate calculation did not address RCS temperature and pressurizer level. This item should have been closed in inspection report 250/251/87-33 when the Unit 3 companion item 250/84-26-01 was closed.



(Closed) Inspector Followup Items 250/84-26-02 and 251/84-27-02: Identify all digital data processing system (DDPS) identification was provided by a licensee internal memorandum dated June 19, 1985.

(Closed) Inspector Followup Items 250/84-26-03 and 251/84-27-03: Establish routine calibration of DDPS parameters used in safety-related calculations. The required calibrations are addressed in the following procedures:

- a. 4-PMI-041.6, RCS Temperature Loop A Protection Channel Set I Calibration, and similar procedures.
- b. Maintenance Procedure 0707.8, Calorimetric Periodic Calibration
- c. Maintenance Procedure 14007.7, Tavg Alarms-Recalibration
- d. Maintenance Procedure 14007.13, Pressurizer Water Level Instrumentation Calibration

(Closed) Inspector Followup Item (IFI) 250/85-19-01: Review Containment Leak Rate procedures to verify that appropriate acceptance criteria for a short duration Integrated-Leakage Rate Test (ILRT), leak testing of the test rig bypass valve, and controls for draining containment penetration piping have been incorporated into the applicable test procedures. The inspector reviewed Operating Procedure 13100.1, Integrated Leakage Rate Test, and verified that the 0.75La limit was specified when performing a shorter duration test in accordance with Bechtel's BN-TOP-1, Rev. 1. The licensee informed the inspector that the ILRT test rig bypass valve had been removed in lieu of seat leak testing the valve. Controls for draining containment penetration piping were not incorporated into the procedures reviewed by the inspector. The inspector questioned the licensee about this and the reply was that the piping is presently being drained prior to testing by verbal directions from the Test Director, but in the future either the procedure will be changed to incorporate controls for draining or the licensee will justify that draining is not required. This matter was identified by IFI 250/87-34-01, Draining Containment Penetration Piping. IFI 250/85-19-01 is closed.

(Closed) IFI 251/86-20-01: Review the Containment Leak Rate report to verify the as-found condition of the containment. The inspector reviewed the containment leak rate report and verified that the as-found condition was documented. This item is closed.

10. Followup of IE Bulletin (92703)

(Closed) Inspection and Enforcement Bulletin (IEB) 80-06, "Engineered Safety Feature Reset Controls." NRC Inspection Report Nos. 50-250/87-26 and 50-251/87-26 reported that all licensee action on IEB 80-06 was complete with the exception of verification of post modification testing. During that inspection, the licensee was unable to locate the IEB 80-06 post modification test results. As a followup on this inspection the

licensee was again requested to provide verification of IEB 80-06 post modification test results and was still unable to locate the test results. At the exit interview the Plant Manager stated that either the test results would be immediately located or new test procedures would be written and performed. This matter is unresolved and will be unresolved item 50-250,251/87-34-01.