



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

Report Nos.: 50-250/88-17 and 50-251/88-17

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 5-8, 1988

Inspector:

for Frank Jape
J. J. Lenahan

8/9/88
Date Signed

Approved by:

Frank Jape
F. Jape, Section Chief
Test Programs Section
Engineering Branch
Division of Reactor Safety

8/9/88
Date Signed

SUMMARY

Scope: This routine, unannounced inspection was in the areas of the containment building tendon surveillance program, IEB 80-11, and followup on a concern pertaining to potential corrosion testing.

Results: In the areas inspected, violations or deviations were not identified. The licensee has implemented initiatives that go beyond the minimum Technical Specification requirements and FSAR commitments which improve the overall effectiveness of the tendon surveillance program. The licensee's corrosion testing program for the intake structure significantly improves the licensee's long term preventative maintenance program.

8808230280 880810
PDR ADDCK 05000250
Q PNU



REPORT DETAILS

1. Persons Contacted

Licensee Employees

- *B. A. Abrishami, Systems Performance Engineer
- *J. Arias, Jr., Regulation and Compliance Supervisor
- *K. Buzek, Technical Staff Engineer
- *D. A. Chaney, Engineering Manager
- *J. E. Cross, Plant Manager
- *R. Hart, Licensing Engineer
- M. Joseph, Corrosion Engineer
- *T. D. Joseph, Civil Engineer

Other licensee employees contacted during this inspection included craftsmen, and administrative personnel.

Other Organizations

- R. Blum, Structural Engineer, Bechtel
- A. Salley, Structural Engineer, Bechtel

NRC Resident Inspectors

- D. R. Brewer
- *T. F. McElhinney

*Attended exit interview

2. Containment Building Tendon Surveillance, Units 3 and 4 (61700)

The inspectors examined procedures and quality records related to the Units 3 and 4 tendon surveillance program and observed work activities relating to the Unit 4 tendon surveillance inspection. Acceptance criteria utilized by the inspector appear in Technical Specification (TS) 4.4.5.

a. Review of Tendon Surveillance Procedure

The inspector examined the following procedures which control the tendon surveillance activities.

- (1) FP&L Procedure number O-SMM-051.2, Containment Tendon Surveillance.
- (2) Bechtel Procedure number 18712-106-CP-1, Tendon Surveillance Procedure for Containment Structure Post-Tensioning System - Unit 3.

- (3) Bechtel Procedure Number 18712-106-CP-2, Tendon Surveillance Procedure for Containment Structure Post-Tensioning System - Unit 4.
 - (4) Interim Units 3 and 4 TS 4.6.1.7.1. The licensee is in the process of upgrading the Turkey Point technical specification by adopting the Westinghouse Standard TS. The licensee is using the proof and review copy of the upgraded tendon surveillance TS for guidance in the current tendon surveillance inspection. Requirements of the upgraded TS exceed the requirements of TS 4.4.5.
- b. The inspector witnessed stressing operations for determination of the lift off forces in the buttress 1 end of horizontal tendons 13H48 and 13H49. These operations were performed in accordance with requirements of the procedures listed in paragraph 2.a, above. The inspector examined the anchorage assemblies on the above listed tendons and verified that inspections of the anchorage assemblies was conducted in accordance with the procedural requirements. The inspector also witnessed sampling of the tendon corrosion protection materials (grease) from tendon 13H48.
- c. Review of Quality Records Relating to Tendon Surveillance. The inspector examined the following records:
- (1) Surveillance inspection records for Unit 3 tendons numbers 12V3, 23V1, 45V7, 61V1, 61V2, 1D53, 2D28, 3D28, 13H47, 42H20, 62H18, and 64H50. These records included the results of end anchorage inspection, lift off data, sheathing filler inspection, and testing results.
 - (2) Results of tensile testing performed on wire samples from tendon number 61V1.
 - (3) Lift off data from Unit 4 tendon numbers 62H38, 42H80, 64H70, 12V29, 34V29, 56V29, 13H48, 13H49, 13H50, 13H51, and 13H52.

Review of the lift off data for the Unit 4 tendons disclosed that tendon number 13H51 had a prestress force slightly (approximately 0.5%) below the predicted lower limit. Testing of this tendon was performed per the requirements of the interim TS. The current TS does not require that the surveillance inspection to be performed on this tendon. The predicted lower lift off value was calculated using criteria contained in Regulatory Guide 1.35.1. After observing that the lift off in Tendon 13H51 was below the predicted lower lift-off value, the lift off was checked in the two adjacent tendons, 13H52 and 13H50, per the interim TS. Tendon 13H52 was above the predicted lower lift off value, while tendon 13H50 was slightly (approximately 0.5%) below the predicted lower limit. The lift off in tendon 13H49 was then checked and found to be also slightly low. Lift off in the next adjacent tendon (13H48) was checked and the prestress was found

to be greater than the predicted lower limit. Although the measured prestress in the three tendons was found to be slightly below the predicted lower limit, the measured prestress in the tendon was 10% greater than the minimum required effective stress for horizontal tendons listed in the FSAR. The licensee will submit a special 30 day report to NRC describing the low lift off values and the engineering evaluation of the containment.

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

3. Case No. RII-88-A-0022

a. Concern

An individual, hereinafter referred to as the allexer, contacted NRC Region II, and expressed concerns relating to corrosion testing that the licensee was performing on the intake structure. The allexer stated that he was concerned regarding the lack of procedures and acceptance criteria for performance of the testing, and the qualifications of the personnel performing the testing.

b. Discussion

The inspector discussed the intake structure corrosion testing program with licensee engineers. These discussions disclosed that the licensee decided to under take a program to determine the potential for corrosion of the reinforcing steel in the intake structure after corroded reinforcing steel (rebar) was found in several areas on the intake structure in 1985. The problems involving the corroded rebar and spalled concrete were dispositioned on Nonconformance Report (NCRs). The inspector examined the NCRs listed below which document and disposition damage to rebar and concrete on the intake structure. The NCRs were dispositioned on a case by case basis by determining the extent of damage to the rebar and repairing the localized area of damaged concrete. NCRs examined by the inspector were as follows: 1985 NCR Nos. 302, 321, and 436; 1986 NCR Nos. 321, 334, 349, 362, 392, 393, 396, 403, 918, 923, 924, 979, 1005, and 1038; and 1987 NCR Nos. C-156, C-0261, C-0286, C-320, C-346, C-387, and C-410.

In order to determine the long term potential for corrosion of the reinforcing steel in the intake structure, the licensee retained a consultant, Law Engineering Testing Company, in 1986 to conduct a testing program on the concrete in the intake. This program consisted of copper-copper sulfate half cell testing on the in-place concrete, and chemical analysis of samples of concrete obtained by drilling small diameter holes in the concrete at various locations. The purpose of these tests was to determine the chloride intrusion in the concrete. The results of their testing are summarized in a Law Engineering Report, dated March 9, 1987, title "Report of Intake Structure Concrete, Reinforcing Steel, and Corrosion Evaluation."



Based on the data and recommendations contained in the Law Engineering Report, the licensee decided to conduct additional corrosion studies using non destructive methods, i.e., the copper-copper sulfate half cell test. In a letter dated October 22, 1987, (Letter No. JPEC-PTP-87-2354), the Turkey Point Engineering Section requested that the FP&L General Engineering Department, Research and Evaluation Laboratory, conduct the corrosion potential study. The inspector interviewed the corrosion engineer from the General Engineering Department who conducted the corrosion study. Discussions with the corrosion engineer disclosed that the testing was conducted in accordance with ASTM Standard Test Method C-876, Half Cell Potentials of Reinforcing Steel in Concrete. The corrosion engineer stated that he had used similar test equipment (half cell tests) to determine corrosion potential in various other materials. The corrosion engineer described the test program to the inspector, including lay out of the test grid, the reasoning behind selection of the grid pattern and the purpose at the testing. These discussions disclosed that there was no go - no go acceptance used since the purpose of the testing was to map potential corrosion areas for future evaluation. The data gathered from these approximately 1000 individual half cell tests was presented on potential contour maps. The inspector examined the maps and noted that they show equipotential contours which indicate potential rebar corrosion on the intake structure deck. Presentation of the data on these maps is in accordance with the recommendation of ASTM C-876.

Licensee engineers indicated that additional non-destructive testing will be performed on the intake structure. The overall purpose of these studies is to obtain a long term solution to the rebar corrosion problem which to date has been confined to small localized areas.

c. Findings

The allegor's concerns were not substantiated. Based on discussions with the corrosion engineer responsible for conducting the half-cell testing, the inspector concluded that this individual was experienced and well qualified to direct the testing program. Since this was an ongoing study, the licensee did not have a defined procedure which described in detail the precise location of each test to be performed. The test locations were established based on the experience of the corrosion engineer and the guidance in ASTM C-876. Since the purpose of the testing was to obtain data, there were no specific acceptance criteria other than to collect data. The actual testing half-cell procedure was controlled by the ASTM standard.

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

4. (Closed) IE Bulletin 80-11, Masonry Wall Design

FP&L submitted its 60-day IE Bulletin 80-11 response for Turkey Point Units 3 and 4 to NRC Region II in a letter dated July 24, 1980. FP&L

submitted its final report (180 day) on IEB 80-11 to NRC Region II in letters dated November 4, 1980; February 11, 1980; and April 3, 1981. FP&L provided additional information to NRC regarding masonry wall design criteria in letters to the NRC Office of Nuclear Reactor Regulation (NRR) dated May 27, 1983; November 7, 1983; January 7, 1984; and February 1, 1984, subject: Masonry Wall Design - Request for Additional Information. The NRC Office of Nuclear Regulation issued a safety evaluation report on masonry wall design for Turkey Points Units 3 and 4 and concluded that the masonry walls would withstand specified design load conditions, provided that results of tests on in-place materials in the existing wall demonstrated that the materials meet or exceed design requirements. In a letter to NRC dated October 30, 1987, the licensee provided the additional information requested by the inspector in NRC Inspection Report 50-250, 251/87-21. This information addressed design controls to prevent installation of safety-related equipment in the proximity of non-seismically designed walls, and the results of the in-place material (prism) tests performed to determine if materials (masonry block and mortar) used to construct the masonry block walls met design specification requirements. Based on result of the prism tests, the licensee concluded that the masonry materials were adequate to meet design requirements. In the October 30, 1987 letter, the licensee stated that working stress criteria were used for analysis of all safety-related masonry walls with the exception of the steam generator feed pump enclosure wall. The use of arching analysis to evaluate the steam generator feed pump enclosure walls was specifically approved by NRR.

Based on this review of the licensee's actions to compete IE Bulletin 80-11 requirements during inspections documented in NRC Inspection Report Numbers 50-250/80-29, 50-251/80-28, 50-250, 251/83-21, 85-16, and 87-21 and review of the licensee design evaluation by NRR, IE Bulletin 80-11 is closed.

5. Exit Interview

The inspection scope and results were summarized on July 8, 1988, with those persons indicated in paragraph 1. The inspectors described the areas inspected and discussed in detail the inspection results listed below. Proprietary information is not contained in this report. Dissenting comments were not received from the licensee.