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

Report Nos.: 50-250/87-26 and 50-251/87-26

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: May 18-21 and May 25-29, 1987

Inspectors: P. A. Taylor for M. Thomas — 6/30/87 Date Signed

Thomas F. McElhinney T. F. McElhinney — 6/30/87 Date Signed

Approved by: P. A. Taylor for F. Jape, Section Chief — 6/30/87 Date Signed
Engineering Branch
Division of Reactor Safety

SUMMARY

Scope: This routine, unannounced inspection was in the areas of witnessing special test "Dual Unit Loss of Offsite Power with Single Unit Safety Injection" and reviewing NRC open items.

Results: No violations or deviations were identified.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*J. Arias, Jr., Regulation and Compliance Supervisor
*C. J. Baker, Plant Manager - Nuclear
*W. B. Bladow, QA Superintendent
*R. Hart, Licensing Engineer, Regulation and Compliance
*L. Montgomery, JPE Site Lead Electrical/I&C Engineer
*F. H. Southworth, Maintenance Superintendent - Nuclear
J. C. Strong, Electrical Maintenance Supervisor

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

NRC Resident Inspectors

D. Brewer
*K. VanDyne
*J. Macdonald

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on May 29, 1987, 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 licensee did not identify as proprietary any of the materials provided to or reviewed by the inspectors during this inspection.

3. Licensee Action on Previous Enforcement Matters

a. (Closed) Unresolved Item 50-250, 251/83-14-01, "Intermixing of Cables in Redundant Safeguard Cable Trays". On March 30, 1983, an electrician expressed his concern about cable segregation to the NRC Senior Resident Inspector (SRI). He indicated that segregation of cables, including the combining of control and power cables in the same tray, was different from what he had seen at other nuclear plants. The NRC inspectors observed the intermixing of cables between redundant safeguard trays, Trains A and B, in the open area of the turbine building outside of the control building and in the turbine building mezzanine deck. The inspectors substantiated the worker's concerns; however, the Turkey Point Final Safety Analysis Report (FSAR) allows intermixing of non-safety-related

(N-S/R) cables with safety-related (S/R) cables, and also the combining of power and control cables in the same tray. At the time of the inspection by the NRC, the licensee was unable to identify some of the cables which were common to the redundant safeguard trays. Therefore, the inspectors requested that the licensee identify these cables and if they are N-S/R, how the S/R cables are protected from an adverse failure in the N-S/R cables. Florida Power and Light (FPL) has determined that the cables provide non-safety functions or are non-energized spares. All but one of the non-safety-related energized cables identified are protected by circuit breakers or fuses which will isolate the non-safety cable if a short circuit failure were to occur. The cable which does not use an isolation device is a low energy metering/relaying current transformer circuit. An open or short in this cable will not result in damage to adjacent cables because of the low energy available from the current transformer. The NRC inspectors find FPL's response to this item adequate. This item is closed.

b. (Closed) Violation 250, 251/83-14-03, "Procedures do not exist to require a routine seismic evaluation of cable tray systems as a result of plant modifications affecting in this area." This item relates to the addition of new cables initiated by a Plant Change Modification (PC/M) or Design Changes. The addition of these cables increases the weight of the cable tray systems, which can have an effect on the seismic analysis for the cable trays. The licensee did not have procedures to perform a routine evaluation of the seismic cable tray systems when cables were added by PC/M or Design Change. FPL also did not verify that these seismic evaluations were performed by their contractors either. FPL concurred with the violation in their response dated July 5, 1983, and committed to adding the requirement to perform a seismic loading evaluation to FPL Engineering Quality Instructions (QI). Procedures will also be implemented by FPL contractors to provide for consideration of seismic loading whenever new cables are routed in the plant. The NRC inspectors reviewed Quality Instruction (QI) 1.2, "Design Activities Delegated by Power Plant Engineering," and QI 3.1 "Control of Design Performed by JPE." These instructions include steps for verification that cable tray seismic design limits are not exceeded by FPL personnel or contractors whenever new cables are routed in the plant. The NRC inspectors find FPL's QIs adequate to preclude further problems in this area. FPL has also performed an evaluation for safety-related and Seismic II/I raceways to establish an allowable fill load which will not exceed the support capacity and will also allow a reasonable future increase of cable to existing trays. This evaluation is discussed further in this report in paragraph 6.b., IFI 50-250, 251/83-14-02, "Program and Evaluation of Cable Tray Overfill." This item is closed.

4. Unresolved Items

Unresolved items were not identified during this inspection.

5. Surveillance Testing (61701)

The NRC inspectors were onsite to witness a special test conducted in accordance with Test Procedure (TP) 336, "Dual Unit Loop with Single Unit SI." The licensee (FPL) committed to performing this test to ensure proper sequencer operation while simulating the Design Basis Accident (DBA) for each unit. This is a direct result of sequencer wiring discrepancies identified by FPL on March 27, 1987, and discussed in detail in NRC Inspection Report Nos. 50-250, 251/87-14, dated May 21, 1987. Prior to performing the test, the licensee had performed a walkdown of the sequencers (3A, 3B, 4A, 4B) to ensure that the as-built drawings reflect the actual installation and configuration of the wiring. The licensee generated nonconformance reports (NCRs) Nos. 355-87, 419-87, 579-87, 585-87, 590-87, and 593-87 as a result of the sequencer walkdown. The discrepant conditions and their resolution and evaluation, as necessary, are documented in the NCRs. The NCRs are only an interim disposition until FPL engineering completes the final operability assessment evaluation.

While preparing for TP-336 on May 26, 1987, licensee personnel were energizing Unit 3 safeguards racks per procedure 3-ONOP-049, Reenergizing Safeguards Racks After Loss of Single Power Supply, when Unit 3 experienced a partial Train A safeguards actuation when the safety injection (SI) block/unblock switch was released. An investigation of the problem by licensee maintenance personnel revealed that the cause of the Train A SI actuation was a faulty SI block/unblock switch. The reason for only a partial Train A actuation was that a piece of insulation was found in a relay which would not allow it to actuate. The SI block/unblock switch was repaired and all the safeguards racks on both units were vacuumed to remove dust and debris. There were no further problems with the switch during the test. The licensee reported the SI actuation to the NRC and will be submitting a Licensee Event Report (LER) on the incident.

On May 27, 1987, FPL conducted the first part of the test with a dual unit loss of offsite power (LOOP) with Unit 4 as the accident unit. Upon initiating a LOOP by opening switchyard breakers, the 4160V busses stripped and the emergency diesel generators (EDGs) started as designed. The safety-related equipment was then sequenced on by the load sequencers. A discrepancy was noted in that the 3B and 3D load centers did not sequence on after being stripped from the bus. The operators manually loaded them and continued with the test. After all the safety-related loads were verified to be energized, the operators manually initiated a safety injection using the SI Manual Pushbutton on Unit 4. Upon receiving a Safety Injection Actuation Signal (SIAS), the Units 3 and 4 component cooling water (CCW) and intake cooling water (ICW) pumps are designed to strip from the 4160V bus. The operators noted a discrepancy in that the 4B CCW and 4B ICW pumps did not strip from the bus after the SIAS. The next step in the procedure is to verify that the following equipment loads onto the bus: safety injection pumps (3A, 3B, 4A, 4B); 4A and 4B residual heat removal (RHR) pumps; 4A and 4B CCW pumps; 4A and 4B ICW pumps; 4B and

4C Emergency Containment Cooler Fans; 4B and 4C Emergency Containment Filters. The operators noted the following discrepancies: 3B SI pump did not start; 4B SI pump did not start; 4B RHR pump did not start; 4C Emergency Containment Cooler Fan did not start - 4A Emergency Containment Cooler Fan started instead; 3B and 4B Battery Chargers were locked out and could not be manually loaded onto the EDGs.

The next step in the procedure directed the operators to verify that the non-accident units (Unit 3 in this instance) CCW and ICW pumps sequenced back onto the bus. Another discrepancy was identified in that the 3B CCW pump and the 3B ICW pump did not sequence on after the SIAS. The test personnel decided to continue with the test and initiated a Hi and Hi-Hi containment pressure signal to verify that the containment spray pumps started and that its associated valves realigned to the emergency mode. This test of the containment spray circuitry was successful. Test personnel decided to return Units 3 and 4 to pre-test conditions and determine the root cause and corrective actions for the discrepancies noted while performing the test.

On May 28, 1987, the licensee's troubleshooting revealed that two separate wiring problems in the sequencers caused the discrepancies in the test. The first problem identified was in 4B sequencer located in Unit 4 4160 volt "B" switchgear room. Agastat relay 2Z1-4A was found to have two leads rolled. The leads that are required to be connected to contact two were landed on contact five and the leads that go to contact five were landed at contact two. The leads were determined to have been wrongly connected while personnel were performing Agastat timer testing and maintenance on May 22, 1987. This testing was being conducted subsequent to the sequencer NCR walkdown discussed earlier in this report. Plant Work Order (PWO) 5929/64 directs plant personnel to test the sequencer time delay relay by performing procedure O-PME-024.1, "Emergency Load Sequencer Time Delay Relay Test."

As a result of the incorrectly wired Agastat relay, the following components did not respond properly during the test:

- 3B and 4B SI pumps
- 4B RHR pump
- 4B CCW and 4B ICW pumps
- 4C Emergency Containment Cooler Fan

A second problem identified was in the 3B sequencer located in the Unit 3 4160 volt "B" switchgear room. On Agastat relay 2Z1-3A, it was found that an uninsulated metal connector on a spare lug was touching a wire in the

adjoining contact which caused a short. As a result, the following components did not respond properly:

- The sequencing action on 3B did not restart after the SI on Unit 4 which caused the 3B CCW and ICW pumps to not restart.

- Battery chargers 3B and 4B were locked out and could not be manually loaded onto the emergency buses.

- Load centers 3B and 3D did not load onto the bus.

The spare lug was turned so that it did not touch the wire on the adjoining contact. Licensee personnel stated that this wiring problem also occurred during the same time period as the 4B wiring problem discussed above (during performance of Agastat timer testing and maintenance) which was subsequent to the sequencer NCR walkdowns.

Licensee personnel stated that their initial review indicated that both wiring problems appeared to be personnel errors caused by contributing factors. Contributing to the 4B sequencer wiring problem was a similarity between permanent labeling on the wires and plant maintenance identification tags put on the wires, in that, part of the permanent labeling may have been mistaken for the maintenance identification tag (which identifies the wire number). Contributing to the 3B sequencer wiring problem was the "L" shape of the metal connector on the spare lug, in that, the wire on the adjoining contact was connected such that it was allowed to touch the spare lug. Licensee personnel continued to review the above wiring problems and current maintenance practices in order to develop appropriate corrective actions to reduce the likelihood of these problems recurring. The licensee's determination of root cause and corrective actions will be reviewed during subsequent inspections.

No violations or deviations were identified in the areas inspected.

6. Followup on Open Items (92701, 92703)

   a. (Open) Inspection and Enforcement Bulletin (IEB) 80-06, "Engineered Safety Feature (ESF) Reset Controls". On November 7, 1979, Virginia Electric and Power Company (VEPCO) reported that following initiation of Safety Injection (SI) at North Anna Power Station Unit 1, the use of the SI reset pushbuttons alone resulted in certain ventilation dampers changing positions from their safety or emergency mode to their normal mode. Further review discovered that certain ESF-actuated components at Surry 1 and Beaver Valley would return to its normal mode following the reset of an ESF signal; thus, protective actions of the affected systems could be compromised once the associated actuation signal is reset. As a result of these findings,

the NRC issued IEB 80-06 on March 13, 1980, which delineated the following actions to be taken by licensees:

- Review the drawings for all systems serving safety-related functions at the schematic level to determine whether or not safety-related equipment remains in its emergency mode upon reset of an ESF actuation signal.

- Conduct a test to demonstrate that all the equipment remains in its emergency mode upon removal of the actuating signal and/or manual resetting of the various isolating or actuation signals.

- Describe system modifications, design changes, or corrective actions necessary if safety-related equipment does not remain in its emergency mode upon reset of an ESF signal.

Florida Power and Light (FPL) submitted an initial response for Turkey Point Units 3 and 4 dated June 20, 1980. This response identified the safety-related equipment that does not remain in the emergency mode following a reset of the ESF signal.

- Pressurizer Heater Backup Group B
- Containment Cooling Fans V1A, V1B, V1C, V1D
- Containment Sump Pumps P23A and P23B
- Containment Isolation Air Sample Valves V2911, V2912, V2913
- Pressurizer Relief Control Valves CV 455C and CV 456
- Feedwater Main Control Valves FCV 488 and FCV 498
- Feedwater Bypass Control Valves FCV 479, FCV 489, and FCV 499
- Turbine Plant Cooling Water Stop Valve V2201

The licensee determined that the Pressurizer Heater Backup Group B and the Pressurizer Relief Control Valves do not require modifications. Resetting of the SI does not turn on the heaters but allows the heaters to turn on if the proper conditions of pressurizer level and pressure are satisfied. The relief valves will not open upon resetting the SI. Instead, they will return to an "open permissive" mode. Subsequent responses by FPL dated August 1 and October 21, 1980, indicated that modifications would be completed for the containment cooling fans, containment sump pumps, containment isolation air sample valves and the turbine plant cooling water stop valve. Based on the recommendation of FPL's Nuclear Steam System Supply (NSSS) vendor, no modifications were planned for the feedwater main and bypass control valves. The signal that closes the feedwater main control valves is sealed in by a signal from the reactor trip breakers and the valves will remain closed when the SI is reset. The signal that closes the feedwater bypass control valves is sealed in by a latching relay, and these valves will remain closed following a SI reset. In an April 17, 1981 response to a request for additional information by the NRC, FPL indicated that the modifications were scheduled for completion during outages scheduled to start in July 1981 for Unit 4 and September 1981 for Unit 3. FPL also indicated that the control circuits would be tested after the installation of the modifications is completed. The NRC inspectors reviewed Plant Change/Modifications (PC/M) 79-75 and 79-76 which

changed the circuitry of the containment isolation air sample valves such that operator action is required to open each valve even if the engineered safeguards logic is reset.

The inspectors also reviewed PC/M 80-168 which modified the circuitry for the containment cooling fans, containment sump pumps and the turbine plant cooling water stop valve. These modifications consisted of the addition of interlocks so this equipment does not return to its normal mode following an SI reset. At the time of the NRC inspection, the licensee was unable to locate the post modification testing that was performed in order to demonstrate that all safety-related equipment remains in its emergency mode upon removal of the actuating signal and/or manual resetting of the various isolating or actuation signals. This item is open, pending the verification of post modification testing.

b. (Closed) Inspector Followup Item 50-250, 251/83-14-02, "Program and Evaluation of Cable Tray Overfill." The SRI requested that the regional inspectors look into cable tray fill in that certain trays appeared to be overfilled. The NRC inspectors identified some cable trays that were overfilled with regard to FSAR guidelines which allows tray-control 40% (of cross-sectional area), tray-power 30% (of cross-sectional area). The licensee provided an engineering analysis for some of the cable fills but this cable fill analysis was not routinely performed for each PC/M. The licensee indicated that a new cable computer program would be implemented to make this cable fill analysis a routine operation and as part of this computer program, all tray fills that have exceeded the FSAR guidelines would be analyzed or reanalyzed, if necessary, to insure that the fill was acceptable. The NRC inspectors reviewed "Cable Tray Summary Report Turkey Point Project Units 3 and 4," Revision 1 dated May 1985. This report documents the results of FPL's program to determine the as-built routing of all cables in the plant and the review of this information to address cable ampacity and support loading concerns. All cable tray supports were evaluated for dead loads plus seismic loads using Bechtel Civil-Structural Design Criteria, 5177-C-000, Appendix E. The cable fill loads were based on an average cable fill density of 128 pounds per cubic foot (50% power and 50% control cable) or the existing percent fill and density, whichever governed. Appendix A to this report provides a database for purposes of establishing a program for controlling future addition of cable to existing tray sections. Any new attachments or modifications to these cable trays will also be controlled to assure that the allowable fill loads are not affected, or if affected, they are revised. The inspectors also reviewed sample Drawing Change Notices (DCNs) which documented the modifications required in order to qualify certain tray sections for the allowable tray fill loads summarized in Appendix A of the Cable Tray Summary Report. The NRC inspectors find FPL's program and evaluation of cable tray overfill to be adequate. This item is closed.

No violations or deviations were identified in the areas inspected.