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

Report Nos.: 50-250/91-32 and 50-251/91-32

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: August 1-5 and August 12-16, 1991

Inspector: P. Taylor for C. Smith — 10/1/91 Date Signed

P. Taylor — 10/1/91 Date Signed

P. Taylor for M. Thomas — 10/1/91 Date Signed

Accompanying Personnel: F. Jape (August 14-16, 1991)

Approved by: F. Jape — 10/1/91 Date Signed
F. Jape, Chief
Test Programs Section
Engineering Branch
Division of Reactor Safety

SUMMARY

Scope:

This routine, announced inspection was conducted in the areas of design changes and modifications, engineering and technical support activities, and follow-up on previously identified items.

Results:

In the areas inspected, violations or deviations were not identified.

The modification packages reviewed were generally detailed and technically adequate. The inspectors raised questions concerning the adequacy of the

post-modification testing specified for modification PC/M 91-028. Nuclear Engineering (JPN) and the site Technical Department have provided timely and effective support to the plant for various activities. Initiatives implemented by JPN to continue improvement in the quality of the product provided by the architect engineers and JPN were considered a strength.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

D. Baker, Nuclear Supervisor, Production Engineering Group (PEG), JPN
P. Banaszak, Lead Electrical/Instrumentation Engineer, Operations Support
C. Bible, Electrical Supervisor, PEG, Juno Plant Nuclear Engineering (JPN)
*W. Bladow, Quality Manager
T. Carter, Civil Site Engineering Supervisor, JPN
*J. Donis, Operations Support Supervisor
F. Flugger, Chief, Engineering Assurance, JPN
S. Franzone, Project Engineer, Emergency Power System (EPS) and Security Upgrade
R. Gil, Chief Civil Engineer, JPN
*S. Hale, Turkey Point Nuclear (TPN) Engineering Manager, JPN
P. Higgins, Manager, TPN Production Engineering Group, JPN
J. Hosmer, Director, Nuclear Engineering, JPN
*M. Huba, Nuclear Site Engineering Supervisor, JPN
*H. Johnson, Operations Supervisor
*V. Kaminskas, Operations Superintendent
*L. Kennedy, Electrical Engineer, JPN
M. Kulp, Supervisor, Engineering Support Services, JPN
R. Kundalkar, Project Supervisor, EPS and Security Upgrade, JPN
H. Paduano, Engineering Assurance and Program Manager, JPN
*L. Pearce, Plant Manager
*T. Plunkett, Turkey Point Site Vice President
J. Porter, Site Engineering Supervisor, JPN
*D. Powell, Licensing Superintendent
*A. Zielonka, Technical Department Supervisor

Other licensee employees contacted during this inspection included craftsmen, engineers, operators, mechanics, security force members, technicians, and administrative personnel.

Other Organizations

R. Gonzalez, I&C Engineering Supervisor, Ebasco Services, Inc.

NRC Resident Inspector(s)

*R. Butcher, Senior Resident Inspector
*G. Schnebli, Resident Inspector
*L. Trocine, Resident Inspector

*Attended exit interview

2. Design, Design Changes and Modifications (37700)

The inspectors reviewed the PC/Ms listed below to determine the adequacy of the evaluations performed to meet 10 CFR 50.59 requirements; verify that the design changes were prepared and installed in accordance with licensee administrative procedures and applicable industry codes and standards; verify that changes were reviewed and approved in accordance with TS and administrative controls; verify by field walkdown that selected design changes were installed in accordance with the applicable PC/M modification package; verify that applicable operating documents were revised to reflect the subject PC/Ms; verify the modifications were reviewed and incorporated into operations training program as applicable; and verify that post modification test requirements were specified and adequate testing performed. The following modifications were reviewed.

a. DEEP No. 90-416, "Replacement of Agastat Time Delay Relays," Revision 0

DEEP No. 90-416 addresses documentation and replacement of 12 Agastat time delay relays. It also provides design basis information for the existing non-safety related time delay setpoint for tripping the main feedwater pump on low lube oil pressure. The scope of the plant modification involved specifying and procuring time delay relays and providing installation instructions for a time delay relay to be used in Main Feedwater Pump 4A circuit. The DEEP was classified as safety related.

The inspectors reviewed the DEEP and associated procurement document and verified that applicable technical and quality requirements had been established during the design control process. Design basis calculation used for establishing the non-safety related time delay setpoint for tripping main feed pump 4A was reviewed and discussed with the responsible engineer and was found to be technically adequate. The engineering evaluation performed pursuant to the requirements of 10 CFR 50.59 bounded the activities specified in the plant modification, and necessary and required post-modification tests (calibration test) were determined to have been called for in the plant modification package. No deficiencies were identified during review of the plant modification package.

Within this area, no violations or deviations were identified.

b. PC/M No. 90-532, Relay Setting for 4160 Volt Switchgear Breaker

Pursuant to NRC inquiries concerning implementation of the Emergency Power System enhancements during the dual unit outage, an engineering analysis of the C-bus breaker coordination was performed. The analysis was intended to determine the acceptability of Turkey Point Units 1 and 2 cranking diesel generators as a source of power to maintain spent fuel pool cooling with the onsite Units 3 and 4 emergency diesel-generators out of service. The analysis identified

that with fault current below 3200 amperes at the 4160 Volt feeder to the load center transformer, the 4160 Volts tie-breakers between C-bus and the 4160 Volt A and B busses will trip to de-energize the A and B busses.

PC/M No. 90-532 was developed and implemented to correct the problem. The inspectors reviewed the PC/M package and determined that the design scope involved changing the relay settings at Units 3 and 4 switchgears A, B, and C. These overcurrent relays, device S1, are associated with circuit breakers 3AC03, 3AC13, 3AB22, 3AA09, 4AC03, 4AC13, 4AB22 and 4AA09. The engineering evaluation performed pursuant to the requirements of 10 CFR 50.59 was determined to adequately bound the activities specified in the PC/M and did not identify any unreviewed safety question. Design basis calculation 18712-366-E-01, Breaker Coordination Calculation with Power Supplied by the Cranking D/G, Revision 1, provided design inputs for setting the overcurrent relays. Review of the above calculation and the relay coordination sheet (Attachment JPN-PTN-90-3328, page 28 of 28) revealed inconsistencies between the calculated value of short circuit current and the value shown on the coordination sheet. Although this deficiency did not detract from the technical adequacy of the relay coordination settings, the relay coordination sheet was revised at the time of the inspection to eliminate this inconsistency. The inspectors also provided comments concerning the value of sub-transient reactance used in calculating the short circuit current. This value was based on an MVA rating of 3.65 for a typical machine instead of 3.575 which is the nameplate rating of actual installed equipment obtained from plant walkdown data.

The inspectors concluded that PC/M 90-532 was technically adequate for providing the relay coordination settings. Inconsistencies related to the design control process described above did not result in a need to change the relay settings. It does indicate, however, a continued need for attention to detail during the design control process.

Within this area, no violations or deviations were identified.

c. PC/M 91-028, Provisions for the Installation and Operation of a Post-Accident Hydrogen Recombiner

This PC/M provided for plant and procedural changes required to accommodate the installation and operation of an external hydrogen recombiner. The hydrogen recombiner is provided as an alternative to venting the containment atmosphere through the post accident containment ventilation system to control post accident hydrogen concentrations. This PC/M involved removal of the three-quarter-inch local leak rate test connection and reducing insert inside the Unit 3 and Unit 4 containments to allow for a two-inch opening in the return flow path from the hydrogen recombiner. This modification also

replaced the hydrogen recombiner power supply circuit breakers and cabling in safety-related motor control centers 3B and 4C.

During review of the PC/M, the inspectors reviewed the associated 10 CFR 50.59 safety evaluation to verify that the safety evaluation addressed applicable design input information. This included inputs such as heavy load handling, radiation exposure to personnel during post accident installation and operation of the recombiner, emergency diesel generator loading, and battery loading. The inspectors reviewed associated calculations which considered factors such as cable sizing, voltage drop, cable short circuit capability, and piping pressure drop. The calculations were determined to be adequate.

While reviewing the PC/M, the inspectors noted that the PC/M did not specify in the post-modification testing acceptance criteria that the minimum design air flow for the hydrogen recombiner would be verified. The inspectors discussed this observation with licensee personnel who stated that design engineering verbally requested the site to measure recombiner flow during performance of Temporary Procedure TP-735, Hydrogen Recombiner Acquisition, Installation, and Operation for Demonstration. The inspectors observed the operation of the hydrogen recombiner on August 4, 1991, during performance of TP-735 for Unit 3. Although the flow was determined during the test, there was no acceptance criteria specified in the procedure by which it could be determined whether the flow was adequate. However, design engineering personnel who were onsite to observe the test stated that the initial test data indicated that the flow was above the minimum design flow required. The inspector reviewed the test data and concluded that the Unit 3 recombiner flow appeared to be adequate.

No violations or deviations were identified in the areas inspected.

3. Engineering and Technical Support

The inspectors reviewed various activities of JPN and the Technical Department to assess the support provided to the plant operations and maintenance staffs in day-to-day plant activities. These activities included involvement in NCRs, drawing update program, REAs, dual unit outage support, engineering assurance, and system engineering activities.

a. Nonconformance Reports (NCR)

The inspectors performed a review of the nonconformance program controls to verify the adequacy of design engineering support for resolution of material nonconformances. The inspectors determined that deficiencies dispositioned (1) use-as-is or (2) use alternate design or original design requires the involvement of the design engineering staff. These deficiencies are corrected via ANSI N45.2.11-1974 design controls and therefore are evaluated by the

design engineering staff to ensure non-degradation of originally specified technical and quality requirements. The NCR program controls require that an initial assessment of operability be performed by the responsible discipline engineer within three days of receipt of the NCR. Additionally, a 10 CFR 50.59 screening of NCRs is performed to identify if an unreviewed safety question exists. Upon completion of the initial screening and determination of a potential USQ, an upfront 10 CFR 50.59 evaluation of the nonconformance is required.

The inspectors concluded that the degree of involvement and the disposition of nonconformances by the design engineering staff clearly demonstrated a commitment to resolve problems from a nuclear safety standpoint. The effectiveness of the program controls for expeditious resolution of NCRs assigned to JPN is further demonstrated by the small number of NCRs that have been open for greater than 30 days, currently, less than 25.

A detailed evaluation of NCR No. N-91-0747, dated July 12, 1991, was performed to evaluate the disposition of the problem associated with the ASEA/ABB type RXMH-8 auxiliary relays. Interim Engineering Disposition, NCR No. N-91-0747, was reviewed and discussions were held with the responsible engineer to evaluate the technical adequacy of the disposition of this NCR. No deficiencies were identified during these discussions and reviews. Additional reviews of the process by which technical and quality requirements are established for the commercially procured relays were accomplished via review of Package No. CGI 1262-41/42. The inspectors concluded that the above dedication package, along with Test Report No. PSET-1262, "Nuclear Environmental Qualification Report on Emergency Bus Load Sequencers for FP&L Turkey Point Units 3 and 4," provided necessary and required documentation to qualify the relays for safety-related use.

Based on the above reviews, the inspectors concluded that the postulated failure mode, and developed corrective action plan documented in NCR No. N-91-0769 was adequate for disposition of the ASEA/ABB relay failure. Within this area, no violations or deviations were identified.

b. Drawing Control Update Program

JPN has overall responsibility for updating drawings. All priority one drawings (i.e., drawings required for plant operation) are required to be updated prior to signing the system acceptance turnover sheets (SATS) after a PC/M has been implemented. Licensee personnel stated that approximately 7,500 drawings need to be updated as a result of activities during the current dual unit outage. In addition to the drawings generated during the dual unit outage, the licensee is in the process of reducing the backlog of nonpriority one drawings. The backlog has been reduced from a total of 28,000 in February 1989 to the present total of less than 13,000. Licensee

personnel attributed the success in reducing the backlog to additional resources and better controls. The licensee's current schedule is to have the backlog of nonpriority one safety-related drawings completed by March 31, 1992.

c. Request For Engineering Assistance (REAs)

The number of backlogged REAs has continued to decline over the current SALP period. Licensee personnel attributed the reduction to good communication and interface between JPN and the Technical Department. In addition, the Technical Department has improved its methods for prioritizing and screening REAs before sending the REAs to JPN for resolution. JPN site personnel stated that due to the good verbal communications with the Technical Department, JPN is generally aware of the problem prior to receiving the REA. REAs involving real time parts issues and documentation discrepancies go directly to engineering. Those REAs which involve physical modifications to the plant must go before the plant review board.

d. Dual Unit Outage Support

The efforts by JPN during the dual unit outage has been a major contributor to the success of the outage. Over 280 engineering packages (PC/Ms) were required for the dual unit outage and 97 percent of the packages were completed at least 60 days prior to the outage. Licensee personnel stated that the next goal is to complete all the packages at least six months prior to the outage. The licensee established an onsite EPS/Security engineering support team which consisted of approximately 70 engineers. The inspectors observed JPN providing support for resolution of field changes during PC/M implementation, and support to resolve problems which occurred during various startup testing activities. Of particular note was JPN's involvement in resolving the problem with the permanent magnet generator (PMG) installed on the Unit 4 EDGs. After the PMG failed during startup testing, the licensee wrote an NCR and formed an event response team (ERT) to determine the root cause of the problem. This was the third PMG failure since the Unit 4 EDGs were installed. The ERT had completed their investigation and was in the process of writing their report at the conclusion of this inspection.

e. Engineering Quality

The licensee has initiated efforts to improve the quality of the engineering product and services provided by its architect/engineers (A/E) and JPN. Some of the efforts included implementing a nine attribute A/E report card; implementing a calculation program; implementing an engineering assurance program to perform technical assessments of A/Es, vendors and contractors; establishment of the Production Engineering Group within JPN for the purpose of developing PC/Ms in-house; and establishment of a dedicated A/E oversight group. The inspectors reviewed selected reports and assessments of

engineering activities completed during this SALP cycle. The inspectors concluded that the reports and assessments were thorough, in-depth, and effective in identifying technical concerns and other areas which needed improvement. The inspectors considered the licensee's efforts to improve the overall quality of the engineering services were a strength in the design engineering program.

f. System Engineering

The System Engineering Group is a part of the Operations Support Section within the Technical Department. Administrative Procedure 0-ADM-501 describes the duties and responsibilities of the system engineer and establishes basic functions to be performed to improve system performance and reliability.

The inspector's review of system engineering was concentrated in the areas of: adequacy of staffing; system engineering training and certification; and system engineering involvement in plant activities.

Since December 1990, the Units have been defueled and are in a dual outage to support an emergency power systems (EPS) upgrade program. The EPS upgrade program has implemented major modifications to separate Units 3 and 4 emergency power sources. To accomplish the separation, Unit 4 has installed two new EDGs as the onsite standby emergency power. The two existing EDGs are assigned to Unit 3 as the onsite standby emergency power. In addition, extensive modification to the 4160V switchgear, 480V load centers, 480V motor control centers and the installation of new ESF load sequencer was necessary to complete the EPS upgrade.

The inspectors reviewed I/C-electrical system engineers' involvement in work activities associated with the EPS upgrade program. The inspectors determined that I/C-electrical system engineering, specifically, and system engineering group, as a whole, supported the dual Unit outage on a daily basis and assisted in the resolution of system problems.

The review of plant documents and interviews with system engineers showed extensive support as follows:

- Supported the 10-year inservice inspection and required hydrostatic tests of plant systems. System engineers review hydrostatic test packages, conducted system walkdowns and coordinated system tests.

- The I/C-Electrical System Engineering Supervisor is a member of the Joint Test Group (JTG). The JTG reviews all startup activities, including the review and approval of preoperational test procedures and the test results.

- System engineers were assigned to follow specific preoperational tests for their systems and participate in resolving problems that may arise during the test.

- System engineers prepared complex of temporary system modifications to allow electrical and mechanical systems to be worked on during the dual outage. System configuration control was handled through system engineering group to support operating conditions for the Units.

- The restart readiness program was participated in by the system engineer to verify that plant systems are functionally ready to support startup of the Units.

The inspectors reviewed system engineering training program and training records and noted over 70 percent of the system engineers have completed the certification requirements for system engineers. The dual outage has slowed the ability to schedule training. The inspectors were informed that the restart of the Unit by October will allow scheduling system engineers for training in early 1992. The staffing of system engineers at the current levels appears to be adequate based on the present assignment of system and work load.

4. Followup on Previous Inspection Findings (92701)

a. (Closed) IFI 89-203-12

During the NRC inspection, February 25, 1991, IFI 89-203-12, Replacement CCW Heat Exchanger Shell - Side Nozzel Loads, was kept open and the licensee was requested to resolve this item prior to restart. The item remained open due to the fact that calculation C-SJ-13-02 was deficient.

In March 1991, a calculation, C-SJ-511-02, Unit 4 - CCW Heat Exchanger Pedestal Structural Adequacy check was prepared. The new calculation determined that the reinforced concrete pedestals meet all UFSAR design requirements for the CCW heat exchangers.

The inspector reviewed the new calculation and found that the pedestals were evaluated for loads which included weight, thermal and seismic loads from both the nozzles and the direct inertia effect of the heat exchangers. In addition, the calculation included an evaluation to assure that the anchor bolts were capable of developing the resisting moment at the saddle/pedestal interface.

In all cases, the combined moment capacity was greater than required to satisfy the required resisting moment. The anchor bolts were also evaluated and found acceptable for effects of combined shear and tension loads. This items is closed.

b. (Closed) Unresolved Item 50-250, 251/90-13-01, Review Licensee's Commitment and Actions Regarding Installation and Operation of a Hydrogen Recombiner.

The licensee provided a response to this item in a letter to the NRC dated July 16, 1990 (Letter L-90-263). The licensee committed to bring the hydrogen recombiner on site to verify system operability. The licensee completed an agreement with Duke Power Company for obtaining a hydrogen recombiner from the Oconee Nuclear Station where Duke Power stores and maintains the recombiner.

The licensee developed temporary procedure TP-735, Hydrogen Recombiner Acquisition, Installation, and Operation for Demonstration. The demonstration was done using the most restrictive process flow path of both Units 3 and 4 as determined by JPN. Unit 3 was determined to have the most restrictive flow path. This procedure also included steps to install anchor bolts on Units 3 and 4 so that portions of PC/M 91-028 could be completed in conjunction with the hydrogen recombiner demonstration for Unit 3. The inspectors reviewed TP-735 and raised several questions which were discussed with licensee personnel.

The first question involved the fact that the procedure did not provide for individuals to sign-off on completed procedural steps. The inspectors questioned whether not having the sign-offs complied with licensee administrative controls. In addition, the inspectors also stated that by not having sign-offs the potential existed where individuals performing the many steps in the procedure could inadvertently miss some of the steps. Licensee personnel stated that the TP-735 was written in the format of the off-normal operating procedures (ONOP) that would be used if an accident occurred and the hydrogen recombiner had to be used. The off-normal procedures were 3-ONOP-094.3 and 4-ONOP-094.3, Hydrogen Recombiner Acquisition, Installation and Operation. Licensee personnel further stated that the administrative controls allowed them to write temporary procedures using the format of existing procedures. Off-normal operating procedures do not require sign-offs for procedure steps performed.

The inspectors observed operation of the hydrogen recombiner on August 4, 1991. During performance of TP-735, two valve alignment steps were inadvertently missed which resulted in the hydrogen recombiner tripping on low flow. The flow switch on the recombiner was isolated because the steps were not performed. Problem report NPR-073 was written after the missed steps resulted in the recombiner not starting. The inspectors noted that the individual performing the TP-735 at the time steps were missed was initialing by each step as the step was performed. As a result of the hydrogen recombiner test the licensee is revising 3-ONOP-094.3 and 4-ONOP-094.3 to incorporate procedural enhancements identified during the test. The

procedures were scheduled to be revised by August 31, 1991. The licensee is also revising TP-735.

The second question raised by the inspectors involved procedure TP-735 did not delineate any acceptance criteria for verifying system operability. For example, although the recombiner flow was being determined during operation, there were no criteria given by which the flow could be compared for acceptability. In addition, there was no provision for determining whether the hydrogen recombiner heater coils were operating properly (e.g. measuring recombiner temperature or current). Licensee personnel stated that this test was considered a demonstration to show that the hydrogen recombiner could be brought on site, installed, and operated without tripping on low flow. The inspectors stated that the licensee's approach to performing the test was not adequate to demonstrate system operability. However, as stated in paragraph 2.c. of this inspection report, design engineering personnel were on site during operation of the hydrogen recombiner to verify that adequate flow was obtained. Licensee personnel also stated that off-normal procedures 3-ONOP-094.3 and 4-ONOP-094.3 would be revised to include the requirement to measure recombiner current during operation.

The third question raised by the inspectors involved procedure TP-735 did not contain requirements that a completed copy of the procedure be retained as a QA record. The inspectors discussed this item with licensee personnel and reviewed applicable licensee administrative procedure AP-0109.6, Temporary Procedures. Although AP-0109.6 was contradictory concerning retaining completed copies of TPs, licensee personnel agreed that the completed TP-735 should be retained as a QA record. Procedure TP-735 was revised to state that the completed procedure would be retained as a QA record. Licensee personnel further stated that AP-0109.6 was being revised to correct and clarify the contradictory statements concerning retention of completed temporary procedures.

During further discussions, licensee personnel stated that JPN would formally evaluate the hydrogen recombiner data for acceptability. A completed copy of TP-735 and the formal JPN evaluation would also be added to the file for PC/M 91-028.

The inspectors concluded that although there were some procedural weaknesses, the operation of the hydrogen recombiner and the results obtained appear to be acceptable. Therefore, unresolved item 50-250,251/91-13-01 is considered closed. In addition, based on the review of PC/M 91-028; procedures TP-735, 3-ONOP-094.3, and 4-ONOP-094.3; and observation of the hydrogen recombiner operation, the inspectors are closing related TMI Action Plan Items II.E.4.1.2 and II.E.4.1.3.

5. Exit Interview

The inspection scope and results were summarized on August 16, 1991, with those persons indicated in paragraph 1. The inspectors described the areas inspected and discussed in detail the inspection results. Proprietary information is not contained in this report. Dissenting comments were not received from the licensee.