



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

Report Nos.: 50-250/91-39 and 50-251/91-39

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: September 16-20, 1991

Inspector: M. Hunt 11/12/91
 M. Hunt
 G. Wiseman
 M. Miller
 Date Signed

Approved by: M. Shymlock 11-12-91
 M. Shymlock, Chief
 Plant Systems Section
 Engineering Branch
 Division of Reactor Safety
 Date Signed

SUMMARY

Scope:

This was an announced Triennial Postfire Safe Shutdown Reverification and Assessment (Module 64150). Its purpose was to assess whether the licensee has a functioning configuration management program for fire protection and postfire safe shutdown capability as it relates to the Emergency Power System (EPS) Enhancement Project. This Project installed two new Emergency Diesel Generators and associated equipment in a new structure located northeast of the Unit 3 Containment Building. In addition new electrical equipment was installed, cable raceways were added, deleted and, rerouted for plant systems associated with the reassignment of previously common equipment to specific units and repowering of other electrical equipment. The inspection verified that the licensee has a program to maintain the postfire safe shutdown capability achieved during the initial validation inspection perviously conducted at Turkey Point Units 3 and 4 November 13-17, 1989 (NRC Inspection Report 50-250, 251/89-37).

The inspection covered several major areas as they relate to Appendix R compliance and postfire safe shutdown capability including the EPS Enhancement Project modification review, verification of Appendix R Fire protection and separation features, and review of engineering evaluations for fire protection. Emphasis was placed upon review of the configuration control program for the EDG Enhancement Project, as it relates to maintaining Appendix R compliance and the postfire safe shutdown capability.



The inspection also included a review of the condition of a portion of the plant Electrical Distribution System (EDS) related to the 480 volt and 4160 volt busses and their associated relaying. Finally the inspection reviewed a sample of the electrical modification packages for completeness and design considerations.

Results:

During this inspection, the NRC inspectors discussed the plant Appendix R configuration management program history with plant and corporate staff and management. The licensee's responses to these discussions and the results of this assessment indicate that Florida Power and Light Company has developed and implemented a design change program which considers the potential affects of plant modifications on Appendix R compliance and the postfire safe shutdown capability.

In general, the licensee's configuration management program as it relates to maintaining Appendix R compliance and postfire safe shutdown capability was found to be adequate with several strong features. Management appears to be taking the appropriate actions to maintain Appendix R fire protection long term compliance. Therefore, based upon the satisfactory results of this inspection, a detailed 10 CFR 50 Appendix R compliance reverification inspection for Turkey Point is not warranted at this time.

Assessment

- * Quality of the safe shutdown analysis for the Enhancement Project was consistent with original SSA reviewed by NRC in 1989.
- * Modifications provided in the project enhanced the Appendix R program in the reduction of extensive operator actions.
- * Self assessment audits and post modification emergency lighting walkdowns provide licensee assurance that the modifications were complete and satisfactory.
- * The fuse control program needs to be completed which includes identifying fuses in panels.
- * Protective relay setting drawings and improved calibration procedures need to be completed and issued.
- * The preventive maintenance (PM) program has improved the material conditions of the medium voltage switchgear.
- * A violation was identified for No PM Program for Transfer Inhibit Relays.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

- *J. Arias Jr., Technical Advisor to Vice President
- *P. Banaszak, Electrical Engineer
- *C. Bible, Electrical Supervisor, Design
- *C. Fisher, Staff Mechanical Engineer, Design
- *G. Gadow, Procedure Upgrade Program
- *S. Hale, Engineering Project Manager
- *R. Heisterman, Asst. Superintendent Electrical
- *V. Kaminskis, Operations Superintendent
- *J. Knorr, Regulation and Compliance Supervisor
- *V. Laudato, Fire Protection Engineer
- *L. Leon, Protection and Control Coordinator
- *G. Patrissi, QA/Fire Protection
- *L. Pearce, Plant Manager
- *T. Plunkett, Vice President Nuclear
- *D. Powell, Licensing Superintendent
- *M. Powers, Protection and Control Department
- *K. Reynolds, Electrical Engineer, Design
- *F. P. Schiffley, Project Engineer
- *G. J. Traczyk, Supervisor Fire Protection
- *G. A. Warriner, QC Supervisor

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

EBASCO

- *W. E. Harvey, Safe Shutdown Analysis (SSA) Mechanical Engineer
- *M. P. Horrell, Licensing Manager
- *M. Walsh, Electrical Engineer
- *K. A. Williams, Fire Protection Engineer

NRC Resident Inspectors

- *R. Butcher, Senior Resident Inspector
- *G. A. Schnebli, Resident Inspector
- *M. V. Sinklue, Chief, Reactor Projects Branch No. 2
- *L. Trocine, Resident Inspector

*Attended exit interview.

2. Review of Configuration Management Program For Appendix R Compliance

The revision of electrical circuits (both control and power) must be carefully controlled once the overall Appendix R program components and circuits have been installed, protection inspected and accepted. This is especially important during modifications of the magnitude that were made during the EPS Enhancement project at this site.

The inspector reviewed the high-low pressure interface valve circuits to determine that none were modified without considering compliance to Appendix R requirements.

If a fire were to occur in certain areas of a plant, control wiring which is used to operate isolation valves and dampers could be damaged. Of greatest concern are those valves and dampers which protect low operating pressure systems from higher pressure systems. Valves of these types are generally motor operated or solenoid air valve operated. To protect against unwanted or spurious operation of high-low interface valves in the event of a fire, control circuits are so designed and installed to assure that hot shorts will not cause spurious operation of equipment. Additional protection is accomplished by the separation of cables/wire in critical circuits to remove the chances of hot shorts. Cables are wrapped when necessary to provide needed protection.

During the Appendix R inspection conducted in 1989 these circuits were reviewed in detail. This inspection was performed to evaluate the impact of the EPS Enhancement project.

The licensee had also performed an evaluation and provided the drawings denoting the changes that had been made to the power circuits for the following motor operated valves:

LCV * 115 c - VCT Low Level Isolation

MOV * 744A - RCS to RHR

MOV * 744B - RCS to RHR

MOV * 862A - RWST to RHR

MOV * 862B - RWST to RHR

* denotes units 3 and 4 valves

Frequently only the power circuits cabling was modified for these valves. It has been accepted that a perfect phase to phase short on power cabling during a fire is not creditable. The licensee has evaluated the fire-induced spurious actuations and the drawings reviewed by the inspector appear adequate and acceptable.



3. Review of Fire Area/Zone Changes for the EPS Enhancement Project

The licensee has revised the Turkey Point Fire Hazards/Safe Shutdown Analysis (SSA) to show the essential cabling required for safe shutdown for a fire in each fire zone affected by the EPS modifications. The safe shutdown functional requirements of the added EPS were not different with respect to the existing SSA. As such, the licensee's overall safe shutdown provisions remained unchanged in the EPS safe shutdown analysis revision; however, 18 new fire areas/zones were created or revised by the EPS enhancement.

An inspection was made in a sample of those fire areas/zones affected by the emergency power upgrade to determine if redundant cabling for selected plant safe shutdown systems had been provided with adequate separation or protected in accordance with Appendix R to 10 CFR 50 requirements or previously NRC approved exemptions. Included in the review was an evaluation of the adequacy of the installed penetration seal systems, fire damper/fire doors, and fire barrier wraps with respect to physical conditions, location, and completeness.

Within the following fire areas and their associated fire zones, the cable routings for selected chemical volume and control, component cooling water, emergency diesel generators, and heating, ventilation, and air conditioning safe shutdown functions and the fire protection features afforded for these areas were inspected:

<u>Fire Area/Zone</u>	<u>Description</u>
G/25	Electrical Equipment Room
G/25A	Spare Battery Room
W/70	4160V Switchgear Room 3B
DD/73	480V Load Center 4A and 4B
FF/95	480V Load Center 3A and 3B
RR/138	EDG Room 4A
SS/133	EDG Room 4B
TT/134	Switchgear Room 3D
UU/139	Switchgear Room 4D
VV/140	EDG Control Room 4A
WW/141	Diesel Oil Transfer Pump Room 4A
YY/135	EDG Control Room 4B
OD/143	EDG 3 Roof Area
OD/84	Auxiliary Feedwater Pump Area
OD/118	Control/Auxiliary Building Roof

Based on the review of the routing of the sampled safe shutdown cables and the fire barrier protection features of the listed fire zones, the level of protection provided was found to be in an equivalent acceptable condition as found in the initial Appendix R validation inspection conducted in 1989.

Additionally it was noted by the inspectors that several modifications made to the emergency power system for the Chemical Volume and Control System (CVCS), and the Auxiliary Building Ventilation and Air Conditioning Systems (HVAC) resulted in more conservative cable separations and/or passive barrier protection such that extensive manual operator actions previously required to align or energize safe shutdown equipment have now been deleted.

The inspectors also reviewed Engineering Evaluations (EEs); FPE 89-06 dated October 20, 1989 and PTN-FPER-90-007, dated February 12, 1991; which justify fire barriers provided for protection of embedded conduit and concealed electrical manholes, cable pits and duct banks associated with the Units 3 and 4 EDG buildings. The EE's reviewed were technically adequate and followed the guidelines provided in NRC Generic Letter 86-10.

No discrepancies were identified.

4. Review of Appendix R Fire Protection Features

During this inspection, the inspectors verified that the plant configuration for fire protection features were as described in the NRC Safety Evaluation provided for License Amendments Nos. 145 and 140, dated August 16, 1991, for the Turkey Point Plant, Units Nos. 3 and 4 respectively. The amendments included changes to the Technical Specifications which incorporated the additional fire detection and manual fire fighting features installed as a part of the EPS Enhancement Project. The inspectors verified by field walkdown that the installation of fire detection systems for the Auxiliary Building Electrical Equipment Room (Fire Zone 25); Spare Battery Room (Fire Zone 25A) and the Unit 4 Diesel Generator Building (Fire Zones 133, 134, 135, 136, 138, 139, 140, 141) provided the proper type and number of detector units as indicated in the revised Technical Specifications. The inspectors also verified the installation and testing provided for the manual hose station, HS-04-09, at the entrance to Unit 4 Diesel Generator Building was in accordance with Technical Specification and National Fire Protection Association (NFPA) Standards. The inspectors found that these fire protection features have been identified on plant drawings and procedures as Appendix R fire protection systems which must be maintained.

No discrepancies were identified.

5. Review of Emergency Lighting

The emergency lights installed to illuminate operator access and egress paths and safe shutdown equipment for several plant areas affected by the EPS upgrade were inspected.

The inspectors expressed concern that in several areas obstructions due to the outage modifications now existed for safe shutdown equipment. The licensee provided the inspectors with their walkdown procedure for Appendix R lights and indicated that a walkdown of Appendix R emergency

lighting as affected by the dual unit outage was being conducted to identify the adequacy of the illumination for access/egress and manual actions required for safe shutdown components required by the Alternate Shutdown (ASD) Procedure ONOP-105. Implementation of this procedure will be sufficient to resolve the inspectors concerns and is not identified as an inspection finding.

6. Turkey Point Electrical Inspection Program Review

The inspectors conducted walkdown inspections and reviewed applicable sections of the maintenance programs for portions of the Electrical Distribution System (EDS). The licensee has two groups onsite responsible for servicing and maintaining the EDS. Each group has its own maintenance program and area of responsibility. The first group is the Protection and Control Group in the Transmission Department. This Transmission Group services and calibrates the protective relays in the plant and switchyard. The second group is the Electrical Group in the Nuclear Maintenance Department. The Electrical Group is responsible for all maintenance activities except protective relays.

The inspectors reviewed the maintenance programs of the Electrical Maintenance Group associated with servicing the 480 VAC and 4.16kV switchgear. In addition, the fuse control program was also examined.

The maintenance procedures for servicing the switchgear scheduled in the preventive maintenance program (PM) were satisfactory. The inspectors confirmed the switchgear has been adequately serviced. The fuse control program was determined to be in the process of becoming an improved program. However, several items need to be completed such as installing labels for the fuse holders in the switchgear panels and bringing panel drawings up to date. The licensee stated fuse labels will be installed in the panels by the end of October 1991. The licensee also stated all non-critical electrical drawings will be brought up to date during the first half of 1992. The critical drawings needed for plant operation are immediately corrected.

The Transmission Group is in the process of updating the calibration program for the protective relays. Calibration procedures are being enhanced and relay setting drawings have been developed. These improvements are the same as implemented at the St. Lucie plant as the result of the Electrical Distribution System Functional Inspection performed during the Spring of 1991. The licensee stated these programs will be completed for use during the next refueling outage (Spring 1992).

Walkdowns

The inspectors performed walkdown inspections of the EDS to determine if the as-installed configuration was in agreement with design drawings and documents (Fuse Lists). In addition the material condition of the electrical equipment was examined. Specific attention was directed to inspecting installed fuses to determine if the licensee had implemented an



effective fuse control program. Additional walkdowns were performed to examine the protective relays. The areas inspected and walked down are as follows:

- * 480 VAC Distribution Load Centers 3A, 3B, 3C, 3D, 4A, 4B, 4C, and 4D.
- * 4.16 kV Buses and Switchgear Cubicles 3A, 3B, 4A, and 4B.
- * Main Switchyard

The inspectors examined 82 cubicles in the 480 VAC and 4.16kV switchgear panels in Units 3 and 4. The material condition of the panels was satisfactory, except the licensee needs to continue his program for capping (taping) the ends of spare leads (wire). The installed fuses were difficult to identify in the panels, but all fuses examined agreed with the fuse control program list. The as-installed configuration of the switchgear and protective relays was in compliance with design drawings. Overall, the inspectors found the 480 VAC and 4.16kV switchgear panels and distribution load centers were in good condition and in agreement with design documents.

During this inspection it was identified that the transfer inhibit time delay relay which is used to block the transfer of power from the auxiliary to the startup transformer, if the transfer does not occur within 10 cycles, was not included in either the Plant Electrical (PE) or Protection and Control (P&C) maintenance programs. Further discussions revealed that during the recently completed integrated safeguards testing of the circuit controlling the fast transfer between the auxiliary transformer and the startup transformer, a modification was made to incorporate contacts from the transfer inhibit relay to delay the "auxiliary transformer breaker open" signal to the sequencer. This modification was required because the sequencer was generating a Loss of Offsite Power (LOOP) signal caused by the minute time that both the auxiliary transformer and startup transformer breakers were open during the transfer. During the post modification testing, Relay Nuclear Work Order Nos. RWO #91-0160 and 91-0161 were issued. The first RWO was to determine why the transfer timing relay did not signal the computer (sequencer). The examination and testing of transfer inhibit relays 162/4A2 and 162/4B2 determined that the contacts used in the sequencer circuit needed burnishing and the contact wipe adjusted. The second RWO directed that the relays 162/3A2 and 162/3B2 be inspected and the contacts burnished and adjusted. The inspectors inquired about the organization responsible for the preventive maintenance (PM) of the relays. The licensee investigated and determined that those relays were not included in either the PE or the P&C maintenance programs. During the inspection period, the licensee made the decision that P&C would be responsible for the calibration procedure and periodic maintenance of these relays. The P&C started working on the required procedures during the inspection period.



These things should be noted regarding these relays.

- a. These relays are of a special manufacture, that is the regular model relays have a 15 cycle time delay on drop out (TDDO). The relays used by the licensee have a special spring that cause only a 10 cycle TDDO. The change to the 10 cycle TTDO was requested by a memo dated March 3, 1976.
- b. While these relays are part of the relay scheme that is tested, during the Auxiliary Transformer to Startup Transformer Auto Transfer Test, the function of the transfer inhibit relay is not really tested because the fast bus transfer occurs in less than 10 cycles. Therefore this test does not determine if the relay will block the bus transfer after 10 cycles.
- c. The relays installed at the time of this inspection were tested, each being timed for three operations. The results were as follows:

<u>Relay ID</u>	<u>ODO Time in Cycles</u>		
3A2	10.5	10.5	10.7
3B2	10.5	10.5	10.5
4A2	12.2	12.2	12.4
4B2	12.0	12.0	12.0
*4A2	10.8	10.8	10.8
*4B2	10.8	10.7	10.7

*These are the replacement relays for the originally tested relays after the Design Engineering group developed an acceptance criteria of 8-11 cycles for the operating range of these relays.

The fact that the licensee did not determine that these relays were in a PM program even though maintenance was required to make them function properly in the sequencer circuits is identified as an apparent violation 50-250,251/91-39-01, No PM Program for Transfer Inhibit Relays.

10 CFR 50, Appendix B, XI, Test Control, requires that components shall be tested in accordance with written test procedures. The test program shall include as appropriate, proof tests prior to installation, preoperational tests, and operational tests during nuclear power plant operation. Contrary to the above, the Unit 3 and 4 transfer inhibit relays were not included in any preventive maintenance program. The Unit 4 time delay relays did not meet the engineering criteria when tested and were replaced.

7. Review of Plant Change/Modifications (PCM)

The inspector reviewed 14 electrical PCMs that were originated on site. The PCMs reviewed were originated either by the licensees engineering staff or by their consultants onsite. In each case a Design Equivalent

Engineering Package (DEEP) was prepared. A DEEP is used by the originating engineering staff to:

- Verify design equivalence to the original design analysis
- Determine if the condition evaluated is an Unreviewed Safety Question
- Determine if a Technical Specification change is required per 10 CFR 50.59.

These DEEPs contained a Nuclear Safety Evaluation Checklist that when completed determines if the PCM

- Changes the plant
- Changes procedures
- Changes FSAR
- Changes Technical Specifications (TS)
- Impacts on the accident analysis (cause change)
- Cause the the margin of safety as defined in the TS be reduced

The PCMs reviewed were:

<u>PCM No.</u>	<u>Unit</u>	<u>Subject</u>
89-336	4	Containment Electrical Penetration Assembly Installation
90-200	3	Containment Sump Level Setpoint Change
90-532	3/4	Relay settings for 4160 Volt Switchgear Breakers
88-242	4	Main Feedwater Bypass Solenoid Valve Replacement
89-518	3	Sequencer Panel Underfrequency Relay Replacement
90-206	4	Same as 89-518
90-344	3	Replace Hagen Power Supplies YQ-3-750 and YQ-3-752
90-405 and 406	3/4	Reconfigure 3 Feedwater Isolation Reset OT-2 Pushbuttons

<u>PCM No.</u> (cont'd)	<u>Unit</u>	<u>Subject</u>
90-416	3/4	Replacement of Agastate Time Delay Relay
90-488	4	Replacement of Select Reactor Protection System Nbfd Relays
91-044 and 045	3/4	Replacement of Emergency Containment Cooler (ECC) component Cooling Water (CCW) Solenoid Valves
91-089	4	Replacement Booster Relay for Flow Transmitter FT-4-1465 (Model BK 8210)
91-102	4	Safety Injection Reset Push Button 4C06 Exchange

The licensee has now changed the Design Control process to contain four categories. These are:

Design Change Request (DCR) - involves administrative drawing and document changes.

Item Equivalence Evaluation (IEE) - involves item equivalency change-out to support maintenance activities.

Minor Engineering Package (MEP) - covers modifications but are not construction intensive. This MEP covers modifications not considered as "A change to the facility" per 10 CFR 50.59.

Engineering Package (EP) - Involves design modifications that requires 10 CFR 50.59 evaluation or are construction intensive.

The procedure JPN-QI 3.1, Rev. 20, Nuclear Engineering Design Control encompass the four design processes listed above. A decision table is contained in the procedure which directs the user to the appropriate design process.

The inspectors did not identify any deficiencies in the PCM reviewed. All were reviewed and signed by the appropriate organization.

8. Exit Interview

The inspection scope and results were summarized on September 20, 1991, 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.

50-250,251/91-39-01, No. PM Program for Transfer Inhibit Relays, apparent violation