



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

Report Nos.: 50-250/91-11 and 50-251/91-11

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 Units 3 and 4

Inspection Conducted: March 2 through 29, 1991

Inspectors: *R. V. Crenjak* 4/19/91
 for R. C. Butcher, Senior Resident Inspector Date Signed

R. V. Crenjak 4/19/91
 for G. A. Schnebli, Resident Inspector Date Signed

R. V. Crenjak 4/19/91
 for L. Trocine, Resident Inspector Date Signed

A. B. Ruff 4/19/91
 A. B. Ruff, Project Engineer Date Signed

R. V. Crenjak 4/19/91
 for R. P. Schin, Project Engineer Date Signed

Approved by: *R. V. Crenjak* 4/15/91
 R. V. Crenjak, Chief Date Signed
 Reactor Projects Section 2B
 Division of Reactor Projects

SUMMARY

Scope:

This routine resident inspector inspection entailed direct inspection at the site in the areas of monthly surveillance observations, monthly maintenance observations, operational safety, plant events, and the emergency power system enhancement program.

Results:

Within the scope of this inspection, the inspectors determined that the licensee continued to demonstrate satisfactory performance to ensure safe plant operations. In addition, the licensee took prompt action to correct the following cited and non-cited violations:

50-250,251/91-11-01, Violation. (Two examples) Failure to document removed instrumentation and related support to reflect the requirement for

reinstallation (paragraph 8.a) and the failure to provide the control room marked up drawings reflecting changes in plant configuration (paragraph 8.b).

50-250,251/91-11-02, Non-cited Violation. Failure to adequately preplan and perform maintenance resulting in loss of power to the 4A 4160 volt bus and subsequent loss of spent fuel pool cooling for approximately two hours (paragraph 9.a).

50-250,251/91-11-03, Non-cited Violation. Failure to verify a clearance boundary by utilizing controlled documents (paragraph 9.b).

50-250,251/91-11-04, Unresolved Item.** Modification made to fire water supply system without prior 10 CFR 50.59 safety evaluation and without required work process controls.

A concern was noted to licensee management that the violation and the second non-cited violation reflected a loss in configuration control which could become precursors for more serious events.

A strength was noted during this period concerning the lockout of the startup transformer. Preplanning for an event of this type was very good. Procedures and equipment were in place to ensure spent fuel pool cooling requirements were met. Personnel reacted to this occurrence in a professional and expeditious manner.

** Unresolved Items are matters about which more information is required to determine whether they are acceptable or may involve violations or deviations.

REPORT DETAILS

1. Persons Contacted .

Licensee Employees

#T. V. Abbatiello, Quality Assurance Supervisor
#J. Arias, Jr., Technical Assistant to Vice President
#L. W. Bladow, Quality Manager
#W. D. Brown, Site Construction Service Manager
#T. A. Finn, Assistant Operations Superintendent
R. J. Gianfrenesco, Assistant Maintenance Superintendent
#S. T. Hale, Engineering Project Supervisor
K. N. Harris, Senior Vice President, Nuclear Operations
E. F. Hayes, Instrumentation and Controls Supervisor
R. G. Heisterman, Assistant Superintendent of Electrical Maintenance
#M. P. Huba, Engineering
V. A. Kaminskis, Operations Superintendent
#J. E. Knorr, Regulatory Compliance Supervisor
#R. Kundalkar, Project Engineer
J. A. Labarraque, Senior Technical Advisor
#M. L. Local, Configuration Group Supervisor
#V. G. Laudato, Fire Protection
G. L. Marsh, Reactor Supervisor
#H. Johnson, Operations Supervisor
*#L. W. Pearce, Plant Manager, Nuclear
*#T. F. Plunkett, Site Vice President
*#D. R. Powell, Superintendent, Plant Licensing
K. L. Remington, System Performance Supervisor
*R. E. Rose Design Control Supervisor
*C. V. Rossi, Quality Assurance Supervisor
G. M. Smith, Service Manager, Nuclear
R. N. Steinke, Chemistry Supervisor
J. C. Strong, Mechanical Department Supervisor
F. R. Timmons, Site Security Superintendent
#E. J. Traczyk, Fire Protection Supervisor
#G. A. Warriner, Quality Control Supervisor
#M. B. Wayland, Maintenance Superintendent
J. D. Webb, Assistant Superintendent Planning and Scheduling
*#A. T. Zielonka, Technical Department Supervisor

Other licensee employees contacted included construction craftsman, engineers, technicians, operators, mechanics, and electricians.

NRC Resident Inspectors

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



Other Personnel

*A. B. Ruff, Project Engineer, Reactor Projects Section 2A
#R. P. Schin, Project Engineer, Reactor Projects Section 2B

* Attended exit interview on March 15, 1991

Attended exit interview on March 29, 1991

Note: An alphabetical tabulation of acronyms used in this report is listed in paragraph 14.

2. Plant Status

- Control room and main control board modifications continue, with cable pulling and terminations in the control room, annunciator wiring modifications, and replacement switches and instruments being installed.
- All four new sequencers are in place with wiring modifications and terminations in progress.
- The 4A DC bus outage is complete. The 3B and 4B DC buses are currently out of service with modifications in progress.
- Installation of the eight new 480 volt load center transformers is complete and the transformers have been turned over to operations.
- The 3B and 4B 4160 volt bus outages are currently in progress. Phase II of the outage commenced on March 7, 1991, for Unit 4 and on March 8, 1991, for Unit 3.
- The Security System upgrade continues, with the vital area barrier steel grating about 60% completed, installation of CCTV cameras, and testing of individual intrusion detection and access control zones.
- Installation of the new RTD system (removal of bypass loops) continues on schedule.
- Installation of the ATWS system is in progress.
- Inspection and repair of intake structure bays is on schedule.
- The 3B and 4B ICW header inspections are complete and the piping is being reassembled.
- 3A and 3B EDG modifications are in progress. These include idle start modification, new air compressors, new air piping and supports, upgraded turbocharger and stub shaft, and the addition of two air start motors.
- The installation of the new ARMs system is in progress with the installation of the new instrumentation and cable pulling in the control room.



- The Unit 3 high pressure turbine was disassembled for inspection and repair. Unanticipated erosion of the turbine casing and fixed blade mounting surfaces was identified. Repair will require weld buildup and machining. This additional work may impact the outage schedule.
- Four of the five blackstart diesels are operational. The No. 5 blackstart diesel experienced a mechanical failure on March 20, 1991. See paragraph 9.c.
- The outage was on schedule until March 13, 1991, when management stopped all construction activities due to the Unit 4 Startup Transformer lockout event (see paragraph 9.a). Additional work hours were authorized to recover from the loss of time, approximately 10 shifts. Full schedule recovery is expected by April 30, 1991.

3. Followup on Items of Noncompliance (92702)

A review was conducted of the following noncompliances to assure that corrective actions were adequately implemented and resulted in conformance with regulatory requirements. Verification of corrective action was achieved through record reviews, observation, and discussions with licensee personnel. Licensee correspondence was evaluated to ensure the responses were timely and corrective actions were implemented within the time periods specified in the reply.

(Closed) VI0 50-250,251/90-18-03. Failure to adequately control reactor shutdown evolutions resulting in a reactor trip and failure to follow procedure resulting in a reactor trip.

- a. The first example occurred on May 26, 1990, when Unit 4 was inadvertently manually tripped while at approximately 1% power during the performance of 4-OSP-089. The licensee was in the process of performing step 7.2.59, which states: "Trip the Reactor Trip Breakers or continue plant startup in accordance with the requirements of the applicable GOP (N/A if breakers were not reset in step 7.2.8)." With the PSN's concurrence, the RCO tripped the reactor trip breakers resulting in a reactor trip in lieu of continuing with the startup as intended. The cause for the manual reactor trip was a cognitive error made by a licensed utility individual. Step 7.2.59 of procedure 4-OSP-089 offered two options to the RCO. The first option was to trip the reactor. The second option was to continue on with the plant startup in accordance with the GOP. The RCO erroneously chose the first option which was to trip the reactor. The RCO should have selected the second option which would have returned him to the GOP procedure to continue start-up of the unit. The following corrective actions were taken to avoid further violations in this area. Operating Surveillance Procedures 3/4-OSP-089 have been revised. The PSN now decides which option to exercise for Step 7.2.59. An ERT was formed to determine the root cause for the reactor trip and make recommendations to prevent recurrence. The ERT recommended formal operator training on



self-checking. Scheduled training classes on self-checking were completed by August 31, 1990.

- b. The second example occurred on June 15, 1990, when the PSN did not adequately direct the Unit 3 RCOs, as specified in ADM-200, while the unit was being taken offline. This allowed poor communication between the RCOs controlling the reactor and the turbine. The poor communication led to the RCO pulling control rods to raise RCS Tav_g as the turbine was being tripped. This resulted in reactor power increasing above the P-10 setpoint (10% reactor power) which automatically tripped the reactor. The cause for the automatic reactor trip was a cognitive error made by licensed utility personnel. Preparations were being made to manually trip the turbine as part of a controlled unit shutdown to repair an identified condenser tube leak. With reactor power below the P-10 permissive, one RCO was attempting to correct a low RCS average temperature condition by pulling control rods. In doing so, reactor power was increased to the P-10 permissive. A second RCO tripped the turbine without verifying the reactor and steam generators were in a stable condition below 10% reactor power. The following corrective actions were taken to avoid further violations in the area. An entry was made in the Operations Night Order Book to emphasize the need for Control Room Supervisors to establish themselves as the command/control focus of significant operating evolutions. This requires the APSN and PSN to ensure that specific evolution briefings are completed, that communications are accurate and adequate, and that evolutions are smooth and controlled. Scheduled training classes on self-checking were completed by August 31, 1990. This event was reviewed with applicable operations personnel to increase awareness of the potential for undesirable results due to a failure to mentally review the consequences of actions being performed. In addition, the necessity of adequate communications between the different operators and the PSN was stressed during this review since inadequate communications were determined to have been a significant contributing cause of this event. An Operations Department Instruction was issued to clarify those evolutions which require pre-job briefings. Additionally, the instruction defines those tasks requiring assignment of a dedicated individual responsible for evolution oversight.

This violation is closed.

4. Followup on Inspector Followup Items (92701)

Actions taken by the licensee on the item listed below were verified by the inspectors.

(Closed) IFI 50-250,251/89-45-03. ALARA concerns over the practice of venting the containment through the auxiliary building.

The licensee issued PC/M 90-098 to correct this problem. The PC/M provides the following: Replacing the existing carbon steel instrument air bleed line with stainless steel pipe to prevent corrosion in the pipe; Rerouting and resupporting the piping to allow for a continuous downward slope throughout the entire length of piping towards the containment penetration which will allow proper drainage of condensed water; and Insulating the instrument air bleed line to reduce water condensation in the pipe. These changes should prevent the bleed pipe from plugging and thus eliminate the need for venting into the auxiliary building. These modifications are currently scheduled for completion during the current outage. This issue is closed.

5. Onsite Followup and In-Office Review of Written Reports of Nonroutine Events and 10 CFR Part 21 Reviews (90712/90713/92700)

The Licensee Event Reports and/or 10 CFR Part 21 Reports discussed below were reviewed. The inspectors verified that reporting requirements had been met, root cause analysis was performed, corrective actions appeared appropriate, and generic applicability had been considered. Additionally, the inspectors verified the licensee had reviewed each event, corrective actions were implemented, responsibility for corrective actions not fully completed was clearly assigned, safety questions had been evaluated and resolved, and violations of regulations or TS conditions had been identified. When applicable, the criteria of 10 CFR Part 2, Appendix C, were applied.

(Closed) LER 50-250/89-13 and LER 50-251/89-09. Boric Acid Transfer Pumps Out of Service Due to Low Seal Pot Levels.

An entry was added to the operations night order book on September 13, 1989, to inform control room personnel that BATPs are to be considered out of service during the time the nitrogen pressure indicator is removed to refill the seal pots. Caution tags were placed at each of the Unit 3 and Unit 4 BATP seal pots. These tags require operations and/or maintenance personnel to notify the Control Room personnel prior to opening the seal pots so appropriate actions can be taken to maintain Boric Acid System operability. In addition, the licensee is pursuing a boric acid concentration reduction program during this outage which will allow plant operation at or below four weight percent boric acid. This would allow replacement of the current BATP seals with cartridge type single seals which are compatible with the lower boric acid concentration. The use of the new seals would also eliminate the need for the seal water system. This modification should prevent events of this type after the current outage. This LER is closed.

6. Monthly Surveillance Observations (61726)

The inspectors observed TS required surveillance testing and verified that the test procedures conformed to the requirements of the TS; testing was performed in accordance with adequate procedures; test instrumentation was calibrated; limiting conditions for operation were met; test results met



acceptance criteria requirements and were reviewed by personnel other than the individual directing the test; deficiencies were identified, as appropriate, and were properly reviewed and resolved by management personnel; and system restoration was adequate. For completed tests, the inspectors verified testing frequencies were met and tests were performed by qualified individuals.

The inspectors witnessed/reviewed portions of the following test activities:

- O-OSP-301.2, Technical Support Center Emergency Ventilation System Operational Test;
- O-OP-031, Black Start Diesel Operation (for black start diesel generator No. 2); and
- TP-612, Monitoring of Spent Fuel Pump Heat Exchanger Room for Flooding Conditions.

The inspectors determined that the above testing activities were performed in a satisfactory manner and met the requirements of the TS. Violations or deviations were not identified.

7. Monthly Maintenance Observations (62703)

Station maintenance activities of safety-related systems and components were observed and reviewed to ascertain they were conducted in accordance with approved procedures, regulatory guides, industry codes and standards, and in conformance with TS.

The following items were considered during this review, as appropriate: LCOs were met while components or systems were removed from service; approvals were obtained prior to initiating work; activities were accomplished using approved procedures and were inspected as applicable; procedures used were adequate to control the activity; troubleshooting activities were controlled and repair records accurately reflected the maintenance performed; functional testing and/or calibrations were performed prior to returning components or systems to service; QC records were maintained; activities were accomplished by qualified personnel; parts and materials used were properly certified; radiological controls were properly implemented; QC hold points were established and observed where required; fire prevention controls were implemented; outside contractor force activities were controlled in accordance with the approved QA program; and housekeeping was actively pursued.

The inspectors witnessed/reviewed portions of the following maintenance activities in progress:

- Structural Repair of the 3B1 ICW Intake Well;

- Phase Rotation Verification of No. 2 Black Start Diesel Generator After Breaker Maintenance; and
- Troubleshoot No. 2 Black Start Diesel Voltage Regulator Low Voltage.

On March 20, 1991, the licensee performed phase rotation and differential relay checks of the No. 2 BDG. This testing was required because the output breaker for this unit was used for vendor testing of the new 4A and 4B EDGs. To facilitate use of the breaker for the vendor tests, the normal power cables from the BDG were disconnected and temporary cables were installed from the 4A or 4B EDG to the breaker. In order to perform the phase rotation and relay checks, the output breakers from the BDG bus to the Unit 1 and 2 startup transformer were racked out. This removed the BDG battery charger from service for the period of time these breakers were racked out. Four of the five BDGs were available for use during this period as the battery charger was the only component OOS. This testing commenced at 3:25 pm and the BDG bus was returned to normal at 4:45 pm.

For those maintenance activities observed, the inspectors determined that the activities were conducted in a satisfactory manner and that the work was properly performed in accordance with approved maintenance work orders. Violations or deviations were not identified.

8. Operational Safety Verification (71707)

The inspectors observed control room operations, reviewed applicable logs, conducted discussions with control room operators, observed shift turnovers, and monitored instrumentation. The inspectors verified proper valve/switch alignment of selected systems, verified maintenance work orders had been submitted as required, and verified followup and prioritization of work was accomplished. The inspectors reviewed tagout records, verified compliance with TS LCOs, and verified the return to service of affected components.

By observation and direct interviews, verification was made that the physical security plan was being implemented. The implementation of radiological controls and plant housekeeping/cleanliness conditions were also observed.

Tours of the intake structure and diesel, auxiliary, control, and turbine buildings were conducted to observe plant equipment conditions including potential fire hazards, fluid leaks, and excessive vibrations. In addition, the inspectors walked down accessible portions of systems which are currently required to be operable/functional in order to verify proper valve/switch alignment.

The licensee conducted a safety evaluation to define control of the plant configuration during the dual unit emergency power system enhancement project. Procedure TP-645, Defueled Operations Without Emergency Diesel Generators, was issued to proceduralize the requirements determined in the safety evaluation to be in effect from the time both units enter the



defueled condition and both EDGs are removed from service. Also, portions of the revised TSs became effective when both units entered the defueled condition.

As a result of routine plant tours and various operational observations, the inspectors determined that the general plant and system material conditions were satisfactorily maintained, the plant security program was effective, and the overall performance of plant operations was good. In addition, the inspectors verified the critical electrical system lineup and verified the availability of the required number of blackstart diesel generators. Availability of the minimum number of ICW and CCW pumps was also verified.

- a. On March 5, 1991, auxiliary lube oil pump control instrumentation (temperature switch TS 6537A) for the A AFW pump, was observed unattached from its mounting and hanging on a pipe near the A AFW pump. This instrumentation had been removed from its previous mounting on approximately February 28, 1991. As a verification check of the licensee's configuration control process, the licensee was requested to produce the process paper for relocating this particular instrument. The licensee had issued installation list 0466/88-418 to rework the supports for installation of vital areas barriers in the AFW area per PC/M 88-418. While vital area barrier rework was being accomplished in the AFW pump area, instrumentation was encountered that had not been recognized by the PC/M instructions. This instrumentation was installed as part of the AFW pump assembly and therefore was not shown on the normal operating drawings. The Project Field Engineer noted the removed instrument in his log book and also noted the instrument did not have an identification tag.

ASP-23, General Installation Procedures for Electrical Raceways and Supports, paragraph 5.1.5 requires that the Project Field Engineer be responsible for ensuring that all supports required are listed on Attachment A. Paragraph 6.3.1.4 of ASP-23 states that Attachment A is an active document permitting field routed raceway being added to or deleted from without formal revisions. ASP-34, Preparation of Process Sheets and Installation Lists, paragraph 5.4 states that the Project Field Engineer is responsible for insuring full implementation of PC/M requirements by the preparation, review, approval, and revision of all process sheets or installation lists.

TS 6.8.1 requires written procedures be established, implemented and maintained that meet or exceed the recommendations of Appendix A of RG 1.33, Revision 2, February 1978 and Sections 5.1 and 5.3 of ANSI N18.7 - 1972. Section 5.1.2 of ANSI N18.7 - 1972 requires that procedures be followed. The failure to document on Attachment A of ASP-23 the required support to reinstall removed instrumentation, and the failure to revise installation list 0466/88-418 to reflect the requirement to reinstall removed instrumentation is a violation. This is the first example of violation 50-250,251/91-11-01.



b. During a tour of the control room on March 11, 1991, the inspectors reviewed the marked up electrical figures provided to the control room per TP-644, Dual Unit Outage Configuration Control Notification. TP-644, paragraph 3.1.3.2 requires a configuration control notice and a marked up figure notifying the PSN of changes in plant configuration which are expected in the next 24 to 48 hours. The marked up figures are to ensure plant operations is fully appraised of configuration changes, both temporary and permanent, that might occur during the implementation of major modifications. The posted electrical figures (attachments F thru J of TP-644) did not accurately reflect the current plant configuration in that the 3B and 4B 4KV busses were shown as in service. The 3B 4KV bus was removed from service at 12:23 pm on March 8, 1991, and the 4B 4KV bus was removed from service 12:40 pm on March 7, 1991. The operations personnel on shift were fully aware of the revised electrical lineup. TS 6.8.1 requires written procedures be established, implemented, and maintained that meet or exceed the recommendations of Appendix A of RG 1.33, Revision 2, February 1978 and Sections 5.1 and 5.3 of ANSI N18.7 -1972. Section 5.1.2 of ANSI N18.7 - 1972 requires that procedures be followed. The failure to follow TP-644, paragraph 3.1.3.2 and provide the PSN with marked up figures reflecting changes in plant configuration expected in the next 24 to 48 hours is a violation. This will be the second example of violation 50-250,251/91-11-01.

c. On approximately February 8, 1991, nuclear plant fire protection personnel observed that fossil plant personnel and their contractors had welded new piping onto the nuclear plant fire water supply system. Additionally, they were preparing to "hot tap" two four-inch penetrations into the nuclear fire water supply system. This work was being done as part of a modification to the fossil plant (Units 1 and 2) raw water system, to install two new raw water booster pumps. The modification included installing new four-inch recirculation lines from the new pumps. These recirculation lines were welded to the nuclear plant fire water supply system fire pump flow test line near the point where it returned to the bottom of Raw Water Storage Tank II. The flow test line penetrated the Raw Water Storage Tank well below the 18 foot level (335,638 gallons) reserved for the nuclear plant fire water supply, and there was no standpipe inside the tank to prevent the tank from draining through the new raw water booster pump recirculation connections. The affected nuclear fire water supply piping was described in the FSAR and identified as Quality-Related.

On February 8, 1991, a site nuclear engineering memo was written stating that some of the work could continue, but that the "hot taps" were not to be done until a nuclear plant 10 CFR 50.59 safety evaluation was completed and approved. On March 14, 1991, the "hot taps" were done, prior to approval of the 50.59 safety evaluation. On March 22, 1991, the PNSC approved the 50.59 safety evaluation,

which endorsed the fossil plant engineering package. Fossil plant personnel continued with the modification installation.

On March 26, 1991, an NRC inspector observed that the newly installed raw water booster pump "A" recirculation line isolation valve was closed, but not locked closed as required by the engineering package in use. At the time, piping to the "A" raw water booster pump was not completely installed and inadvertent opening of the recirculation line isolation valve could have drained water from the raw water storage tank. The inspector noted that other work controls for nuclear plant modifications, as required by procedure QI3-PTN-1, Design Control, dated February 26, 1991, were not being followed. Examples included:

- procedure control (pen and ink changes were made to the working copy of the engineering package without required review and approval), and
- quality control (a hydrostatic test on March 18, 1991 was later found to be inadequately performed).

Additional review is required to determine the full scope and significance of this event. This item is identified as Unresolved Item 50-250,251/91-11-04, modification made to fire water supply system without prior 10 CFR 50.59 safety evaluation and without required work process controls.

One violation was identified.

9. Plant Events (93702)

The following plant events were reviewed to determine facility status and the need for further followup action. Plant parameters were evaluated during transient response. The significance of the event was evaluated along with the performance of the appropriate safety systems and the actions taken by the licensee. The inspectors verified that required notifications were made to the NRC. Evaluations were performed relative to the need for additional NRC response to the event. Additionally, the following issues were examined, as appropriate: details regarding the cause of the event; event chronology; safety system performance; licensee compliance with approved procedures; radiological consequences, if any; and proposed corrective actions.

- a. On March 13, 1991, at 3:30 pm, the output breaker from the Unit 4 startup transformer to the 4A 4160 volt bus received a lockout signal. This resulted in the isolation of the transformer and the 4A 4160 volt bus. Loss of power to the 4A bus resulted in the loss of SFP cooling since the 4B 4160 volt bus and both EDGs were out of service for modifications during the outage. The cause of the lockout relay actuation could not be determined at the time of the event. The startup transformer was inspected and no relay targets



were found in the tripped position nor were any external causes identified. The switchyard circuit breakers were inspected and two breakers were found open; however lockout relays were not found tripped on these breakers. The switchyard breakers opened because of the lockout on the startup transformer. The 4A 4160 volt bus was inspected and no problems were identified.

Concurrent with the actions being taken to determine the cause of the lockout, the licensee commenced monitoring the Unit 4 SFP temperature every 30 minutes and started efforts to restore power to the 4A bus per existing procedures. Two BDGs were started to provide emergency power to the 4A bus from the 4C bus if required. The PSN declared an Unusual Event at 3:50 pm and all required notifications were made. The startup transformer was reenergized at 4:30 pm from normal off site power and the 4A 4160 volt bus was reenergized at 4:35 pm. Breakers to the 480 volt load centers and motor control centers that were closed prior to the event were reclosed. Normal SFP cooling was restored at 5:27 pm and the Unusual Event was terminated. SFP temperature increased about 3 degrees F during the approximate two hour period the cooling system was not in operation. This rise in temperature was less than predicted by the analysis performed for the safety evaluation for the outage.

An occurrence of this type was considered during the planning for the Emergency Power Systems outage. Procedures were prepared for response to such an occurrence. The systems required to operate in the event of a loss of the capability to provide power from offsite sources worked as designed. Also, a capability existed to tie the Unit 3 startup transformer to the 4A 4160 volt bus if needed. A truck mounted 400 KW diesel was available to provide temporary power to provide cooling to the spent fuel pool. In addition, a diesel powered fire pump and non-vital screen wash pump were available to supply spent fuel pool cooling water. Also, an alternate cooling system, in place for this outage, could have supplied spent fuel pool cooling using non-vital power.

The licensee immediately formed an ERT to determine the cause of the event and a list of most probable causes was developed. A review of drawing 5614-E-28, sheet 19A, indicated if a short circuit occurred (in either panel 4C04 in the Control Room or 4C11 in the Cable Spreading Room) at the appropriate terminal points to increase the voltage to the lockout relay, it would actuate. Also, if the terminals on the lockout relay indicator light bulb in the circuit touched or it's resistor failed, additional voltage would be supplied to the relay causing it to actuate. Two people were working in panel 4C04 in the control room when the event occurred. One electrician was connecting wires in the panel and the other was vacuuming metal filings and chips from the inside of the panel. Licensee management stopped all work in and around all areas that could have contributed to this event or a similar event. Work was to be released by



management pending the outcome of the ERT investigation and after appropriate corrective actions were in place.

In an effort to duplicate the cause of the lockout, the licensee energized the 4A 4160 volt bus by back-feeding through the main transformer, which was disconnected from the Unit 4 generator, and the Unit 4 auxiliary transformer. Power to the startup transformer was then deenergized to facilitate troubleshooting on March 16, 1991. The licensee was only able to duplicate the lockout event when terminals 1 and 3 of the lamp flasher circuit for the indicator light were shorted together by a metal chip. These two terminals are very close together and are located in the area where the person was vacuuming. The licensee concluded that this was the most probable cause as the troubleshooting did not identify other circumstances that reproduced the event.

In order to prevent recurrence, the licensee added additional requirements to existing procedures identifying responsibilities and actions required for work on sensitive equipment. Sensitive equipment was defined as equipment that could have an impact on the vital power supply or the SFP cooling function. A list of sensitive equipment was generated and added to TP-645, Defueled Operations Without Emergency Diesel Generators. In addition, Training Brief No. 288 was issued on March 18, 1991, requiring all responsible personnel be trained in the new requirements prior to management releasing the hold on work in the affected areas.

TS 6.8.1 requires that written procedures be established, implemented, and maintained covering activities recommended in Appendix A of RG 1.33, Revision 2, February 1978. Section 9.a of this Appendix recommends that maintenance that can affect the performance of safety-related equipment should be properly preplanned and performed in accordance with written procedures, documented instructions, or drawings appropriate to the circumstances. The recommendations stated above were not followed in that on March 13, 1991, maintenance on panel 4C04 in the control room was not properly preplanned and performed causing the Unit 4 Startup Transformer to lock out. This caused a loss of power to the 4A 4160 volt bus and subsequent loss of cooling to the Unit 4 Spent Fuel Pool for approximately two hours. This licensee identified violation is not being cited because the criteria specified in Section V.G.1 of the NRC enforcement policy were satisfied. This item will be tracked as NCV 50-250,251/91-11-02, failure to adequately preplan and perform maintenance resulting in loss of power to the 4A 4160 volt bus and subsequent loss of SFP cooling for approximately two hours. This item is considered closed.

- b. On March 12, 1991, fire panel C-285 was inadvertently disabled for greater than one hour without a continuous fire watch being established. This resulted from the following sequence of events.



A clearance request (22360) was submitted for fire suppression system control panel C-285 (Auxiliary Building North-South Breezeway - Deluge System - Fire Zone 79A). When the clearance (3-91-03-050-R) for this request was written, PCON incorrectly printed the identification of breaker 3P31-12, which supplies 120-volt AC power to this control panel, as a spare. The NWE noted that the clearance reflected a spare breaker, signed the approval, and sent the clearance to be hung. The clearance was hung at 12:45 am on March 12, 1991. At 1:00 am, the half-hourly fire watch patrol noticed alarm point 37 trouble alarm at control room panel C-39A and failed to notify any control room personnel of a new off-normal condition. At 1:10 am, the fire watch supervisor noticed the trouble alarm and asked the PSN about it. An NO was dispatched to investigate the trouble alarm and reported that power to control panel C-285 was being supplied from the battery backup. An NPO overheard the radio conversations and reported that he had just hung a clearance on the panel in question. An out-of-service condition for fire zone 79A was determined, and the fire protection supervisor was notified. A continuous fire watch and backup suppression were established per TS 3.7.8.2.c at 2:00 am. The original clearance was released, a new clearance (3-91-03-054-R) was written, the PCON data-base was corrected, and fire protection impairment FPI-4060 was hung. It was later determined that the fire zone 79A was not actually out-of-service because control panel C-285 was being supplied by a battery backup.

Several opportunities existed to identify and/or prevent this event. These included the following:

- PCON incorrectly printed the identification of breaker 3P31-12 as a spare breaker in lieu of the actual power supply breaker, and the need for a fire protection impairment was not evident.
- The NWE signed the approval and sent the clearance to be hung without cross-referencing PCON with the breaker list.
- The NPO who was assigned to hang clearance 3-91-03-050-R on breaker 3P31-12 knew that this would remove power from fire suppression control panel C-285. The NPO also noted that the breaker was labelled differently than the clearance, but assumed that an alternate power supply was being used because there was no requirement for a fire protection impairment and the reason for the request was conduit modifications.
- At 1:00 am, the half-hourly fire watch patrol noticed alarm point 37 trouble alarm at control room panel C39A and failed to notify any control room personnel of a new off-normal condition.

TS 6.8.1 requires that written procedures be established, implemented, and maintained covering activities recommended in Appendix A of RG 1.33, Revision 2, February 1978. Section 1.c of



this Appendix recommends administrative procedures for equipment control (e.g., locking and tagging). Procedure O-ADM-212, In-Plant Equipment Clearance Orders, paragraph 5.8.1.2, requires that the clearance boundary be verified using controlled documents (i.e., prints, procedures). However, paragraph 5.8.1.2 of procedure O-ADM-212 was not followed in that on March 12, 1991, the identification of clearance boundary breaker 3P31-12 as a spare breaker by PCON was not verified by use of a controlled document such as the breaker list. This licensee-identified violation is not being cited because the criteria specified in Section V.G.1 of the NRC Enforcement Policy were satisfied. This item will be tracked as NCV 50-250,251/91-11-03, failure to verify a clearance boundary by utilizing controlled documents. This item is considered closed.

- c. At 7:05 pm on March 20, 1991, the No. 5 blackstart diesel experienced a mechanical engine failure during a routine scheduled surveillance test per O-OP-031. The 3rd cylinder from the NE end of the engine had a connecting rod failure involving the cap for the crankshaft end. The licensee is performing an investigation to determine the cause of the failure. This event investigation will be followed by the resident inspectors.

One violation and one non-cited violation were identified.

10. Emergency Power System Enhancement Program

a. Cable Installation Review (51063)

Two partial cable pulls in conduit were observed for cable numbers 4D0147B and 3B5007A. The former involved two 1/C 750 MCM cables for a DC circuit between the Unit 4 EDG building and the DC room off the Unit 4 cable spreading room. The latter involved three 1/C 750 MCM cables for an AC circuit between the new electrical equipment room (formerly the the hot machine shop area) and the Unit 3 load control center. Both runs started approximately at the mid point of their runs and involved cable lengths only for that portion of the run. The first pull involved approximately 460 feet of cable, but since the cable has to be snaked in and out of conduit, pull boxes, and other pull points to prevent exceeding the bend radius, sidewall pressure, pull tension, and other criteria, approximately 680 feet of cable pull was observed. Of the 480 feet of cable, approximately 80 feet was placed in its final position during the observation period. The second pull involved approximately 500 feet of cable and similar to the above, approximately 1000 feet of cable pull was observed. For the second pull, approximately 200 feet of cable was placed in its final position during the observation period.

During the cable pulls the following observations were made: 1) The licensee adhered to the cable pull card routing including specifications and cable pull calculations, 2) cables were well protected from both physical damage and welding activities when



required, 3) proper pulling compound was used and applied liberally, 4) pulling attachments and tensions were adhered to and were acceptable, 5) scaffolding and climbing aids were used, 6) cable routing was correct, 7) instrumentation was in calibration, 8) proper bend radius was maintained, 9) QC inspectors were qualified and were present and performing their tasks during the handling and installation activity, 10) cable identification was preserved, 11) an adequate number of electricians and QC inspectors were available to perform the pulls, 12) their cooperation and good attitudes toward performing quality work were evident, 13) installation and inspection activities were being documented during the process, and 14) when necessary, nonconforming reports were issued for engineering evaluation.

The licensee's field engineering personnel demonstrated their computer cable pull calculation program via a sample calculation for a typical cable run. Various configurations (different sizes of pulleys and/or sheaves, cable runs, radii, etc.) were used to show their effects on the cable pull tension.

b. Nonconformance Report Review

Nonconforming reports N91-0222, 0228, 0232, 0171, 0136, and 90-0759 associated with cable pulls for the emergency power system enhancement program were reviewed. These reports were readily retrievable and legible, and they were evaluated and reviewed in a timely fashion. The corrective actions and justifications were controlled through the licensee's established channels.

Violations or deviations were not identified.

11. Allegation RII-91-A-0043. Administration of General Employee Training Test.

The inspector reviewed the administration of GET testing at the facility. This included: a review of the examination questions; the method of answering the questions; the method grading the examination; and discussions with responsible licensee personnel.

The examination consists of 20 multiple choice and true/false type questions. Each multiple choice question has four possible answers labeled A through D and the true/false questions are labeled A and B, respectively. The questions are general in nature and the student must obtain a grade of 80% to pass.

The questions are answered on a separate answer sheet that lists each question number 1 through 20 with its corresponding answer letter, A through D. The student is instructed to mark their answers clearly on the answer sheet using a No. 2 pencil.

The answer sheet is then graded using a clear plastic sheet overlay with holes punched out to identify the correct answer. Incorrect answers are then circled in red and totaled. The test is graded by two separate individuals, one Training Grader and one QC Grader.

As previously stated; the student is required to obtain a grade of 80% to pass, which corresponds to a maximum of four incorrect answers. The inspector reviewed the specific answer sheet and test in question and verified that it contained five incorrect answers, which corresponds to 75% and a failure. The answer sheet did not appear to have been tampered with. The inspector considers taking this type of test with a pencil to be typical and adequate.

This allegation could not be substantiated.

12. Outage Status Review by NRC Management

On March 5, 1991, the NRC Region II Regional Administrator and the Director, Division of Reactor Projects toured TPNP to assess the current status of the dual unit outage. On March 27, 1991, the Director, Division of Reactor Projects I and II, NRR, the Assistant Director for Region II Reactors, NRR, and other headquarters management personnel toured TPNP to assess the current status of the dual unit outage. The licensee provided NRC management with the current status of the outage progress, licensing actions, and the general plant startup testing schedule.

13. Exit Interview (30703)

The inspection scope and findings were summarized during management interviews held throughout the reporting period with the Plant Manager - Nuclear and selected members of his staff. Exit meetings were conducted on March 15 and 29, 1991. The areas requiring management attention were reviewed. The licensee did not identify as proprietary any of the materials provided to or reviewed by the inspectors during this inspection. Dissenting comments were not received by the licensee. The inspectors had the following findings:

<u>Item Number</u>	<u>Description and Reference</u>
50-250,251/91-11-01	VIO - (Two examples) Failure to document removed instrumentation and related support to reflect the requirement for reinstallation (paragraph 8.a) and the failure to provide the control room marked up figures reflecting changes in plant configuration (paragraph 8.b).
50-250,251/91-11-02	NCV - Failure to adequately preplan and perform maintenance resulting in loss of power to 4A 4160 volt bus and



subsequent loss of SFP cooling for approximately two hours. (paragraph 9.a).

- 50-250,251/91-11-03 NCV - Failure to verify a clearance boundary by utilizing controlled documents (paragraph 9.b).
- 50-250,251/91-11-04 URI - Modification made to fire water supply system without prior 10 CFR 50.59 safety evaluation and without required work process controls.

A concern was noted to licensee management that the violation and the second non-cited violation reflected a loss in configuration control which could become precursors for more serious events.

A strength was noted during this period concerning the lockout of the startup transformer. Preplanning for an event of this type was very good. Procedures and equipment were in place to ensure Spent Fuel Pool Cooling requirements were met. Personnel reacted to this occurrence in a professional and expeditious manner.

14. Acronyms and Abbreviations

1/C	One Conductor
AC	Alternating Current
ADM	Administrative
AFW	Auxiliary Feedwater
ALARA	As Low As Reasonably Achievable
am	ante meridiem
ANSI	American National Standards Institute
APSN	Assistant Plant Supervisor Nuclear
ARM	Area Radiation Monitor
ASP	Administrative Site Procedure
ATWS	Anticipated Transient Without Scram
CCTV	Closed Circuit Television
CCW	Component Cooling Water
BATP	Boric Acid Transfer Pump
BDG	Black Start Diesel Generators
CFR	Code of Federal Regulations
DC	Direct Current
EDG	Emergency Diesel Generator
ERT	Event Response Team
F	Fahrenheit
FPI	Fire Protection Impairment
FPL	Florida Power & Light
GET	General Employee Training
GOP	General Operations Procedure
ICW	Intake Cooling Water



IFI	Inspector Followup Item
IR	Inspection Report
KV	Kilovolt
KW	Kilowatt
LCO	Limiting Condition for Operation
LER	Licensee Event Report
MCM	Thousand Circular Mils
NCV	Non-cited Violation
NO	Nuclear Operator
NPO	Nuclear Plant Operator
NRC	Nuclear Regulatory Commission
NRR	Office of Nuclear Reactor Regulation
NWE	Nuclear Watch Engineer
OOS	Out of Service
OP	Operating Procedure
OSP	Operations Surveillance Procedure
PC/M	Plant Change/Modification
PCON	Plant Clearance Order Network
pm	post meridiem
PSN	Plant Supervisor Nuclear
QA	Quality Assurance
QC	Quality Control
RCO	Reactor Control Operator
RCS	Reactor Coolant System
RG	Regulatory Guide
RTD	Resistance Temperature Detector
SFP	Spent Fuel Pit
TP	Temporary Procedure
TPNP	Turkey Point Nuclear Plant
TS	Technical Specification
URI	Unresolved Item
VIO	Violation

