UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W., SUITE 2900
ATLANTA, GEORGIA 30323-0199

Report Nos.: 50-335/93-22 and 50-389/93-22

Licensee: Florida Power & Light Co
9250 West Flagler Street
Miami, FL 33102

Docket Nos.: 50-335 and 50-389

License Nos.: DPR-67 and NPF-16

Facility Name: St. Lucie 1 and 2

Inspection Conducted: September 26 - October 23, 1993

Inspectors: A. R. Long — 11/22/93
S. A. Elrod, Senior Resident Inspector — Date Signed

A. R. Long — 11/22/93
M. S. Miller, Resident Inspector — Date Signed

A. R. Long — 11/22/93
L. Trocine, Resident Inspector, Turkey Point Site — Date Signed

Approved by: K. D. Landis — 11/22/93
K. D. Landis, Chief — Date Signed
Reactor Projects Section 2B
Division of Reactor Projects

SUMMARY

Scope: This routine resident inspection was conducted onsite in the areas of plant operations review, surveillance observations, maintenance observations, fire protection review, review of nonroutine events, onsite followup of written nonroutine event reports, and followup of regional requests. Backshift inspection was performed on October 11, 15, 16, 17, 19 and 20, 1993.

Results: Plant Operations:

Operations reacted well to power reductions required to support maintenance on Unit 1 and to the intrusion of jellyfish into the plant intake canal for both units. Changes in power level and plant conditions were conducted appropriately. Operators in both units were alert to several conditions of increasing reactor coolant system leakage and effectively located and isolated leakage paths. Control room operator attentiveness was a strength. (paragraph 3)

Maintenance:

The predictive maintenance program effectively detected a degrading main feed pump thrust bearing, allowing timely repair. Work performed to correct excessive corrosion on the ultimate heat sink (UHS) accumulator was thorough and appropriate. However, a failure to follow a procedure prepared for jumpering the accumulator and a failure to perform a safety evaluation for the installation of the jumper were identified as violations. (paragraph 5)

Surveillance tests observed were effectively performed. (paragraph 4)

Engineering:

Engineering analysis of vibration data was important in defining main feed pump degradation. (paragraph 5.a)

Within the areas inspected, the following violations were identified:

- VIO 335,389/93-22-01, Failure to Follow Procedure for UHS Valves Air Supply Maintenance, paragraph 5.b.

- VIO 335,389/93-22-02, Failure to Perform and Document a 10 CFR 50.59 Safety Evaluation for Temporary Modifications to UHS Valves Air Supply, paragraph 5.b.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

D. Sager, St. Lucie Plant Vice President
* C. Burton, St. Lucie Plant General Manager
K. Heffelfinger, Protection Services Supervisor
H. Buchanan, Health Physics Supervisor
* J. Scarola, Operations Manager
* R. Church, Independent Safety Engineering Group Chairman
R. Dawson, Maintenance Manager
* W. Dean, Electrical Maintenance Department Head
* J. Dyer, Plant Quality Control Manager
W. Bladow, Site Quality Manager
H. Fagley, Construction Services Manager
R. Frechette, Chemistry Supervisor
J. Holt, Plant Licensing Engineer
* J. Hosmer, Site Engineering Manager
* L. McLaughlin, Licensing Manager
G. Madden, Plant Licensing Engineer
A. Menocal, Mechanical Maintenance Department Head
* C. Pell, Site Services Manager
L. Rogers, Instrument and Control Maintenance Department Head
C. Scott, Outage Manager
J. Spodick, Operations Training Supervisor
D. West, Technical Manager
* J. West, Operations Supervisor
W. White, Security Supervisor
* D. Wolf, Site Engineering Supervisor
E. Wunderlich, Reactor Engineering Supervisor

Other licensee employees contacted included engineers, technicians, operators, mechanics, security force members, and office personnel.

NRC Personnel

M. Sinkule, Chief, Reactor Projects Branch 2, Division of Reactor Projects, NRC Region II.
K. Landis, Chief, Reactor Projects Section 2B, Division of Reactor Projects, NRC Region II.
* S. Elrod, Senior Resident Inspector
* M. Miller, Resident Inspector
L. Trocine, Resident Inspector, Turkey Point Site

* Attended exit interview

Acronyms and initialisms used throughout this report are listed in the last paragraph.

2. Plant Status and Activities

Unit 1 began the inspection period at power but the generator was taken off line on September 26 because of a large scale intrusion of jellyfish into the intake canal. The unit was returned to 30 percent power on September 27 but was again taken off line for a jellyfish intrusion that afternoon, returning to service that evening. Unit 1 operated at power the remainder of the inspection period - ending the period in day 21 of power operation since the September 28 turbine startup.

Unit 2 began the inspection period at power. Several power reductions occurred during the period. On September 26, power was reduced first because of the large scale intrusion of jellyfish into the intake canal, then because high chloride ion concentration was reported in 2A SG. A salt water leak in the 2A2 waterbox was suspected. The chloride ion concentration decreased after nine hours and power was restored to the 50-60 percent range while the 2A2 and 2B1 waterboxes were cleaned. No leaking tubes were found. On September 29, Unit 2 power was reduced because the screen wash system header ruptured. This was quickly restored to service. Unit 2 ended the period in day 66 of power operation since startup on August 13, 1992.

Mr. M. V. Sinkule, Chief, Reactor Projects Branch 2, Division of Reactor Projects, NRC Region II, was on site on October 14. His activities included a site tour, discussions with licensee management, and an overview of resident office activities and issues.

The St. Lucie resident inspectors, Turkey Point resident inspectors, and Mr. K. D. Landis, Chief, Reactor Projects Section 2B, Division of Reactor Projects, NRC Region II, met with members of the licensee's nuclear engineering organization in Juno Beach on October 20. The licensee presented discussions on a range of topics involving both FPL nuclear facilities.

Mr. K. D. Landis was on site on October 21. His activities included a site tour, discussions with licensee management, and an overview of resident office activities and issues.

3. Review of Plant Operations (71707)

a. Plant Tours

The inspectors periodically conducted plant tours to verify that monitoring equipment was recording as required, equipment was properly tagged, operations personnel were aware of plant conditions, and plant housekeeping efforts were adequate. The inspectors also determined that appropriate radiation controls were properly established, critical clean areas were being controlled in accordance with procedures, excess equipment or material was stored properly, and combustible materials and debris were disposed of expeditiously. During tours, the inspectors looked for the existence of unusual fluid leaks, piping vibrations, pipe hanger and

seismic restraint settings, various valve and breaker positions, equipment caution and danger tags, component positions, adequacy of fire fighting equipment, and instrument calibration dates. Some tours were conducted on backshifts. The frequency of plant tours and control room visits by site management was noted to be adequate.

The inspectors routinely conducted partial walkdowns of ESF, ECCS, and support systems. Valve, breaker, and switch lineups as well as equipment conditions were randomly verified both locally and in the control room. The following accessible-area ESF system and area walkdowns were made to verify that system lineups were in accordance with licensee requirements for operability and equipment material conditions were satisfactory:

- Intake Structures/ Screen Wash Systems,
- 2C AFW System, and
- Unit 2 CST and piping

b. Plant Operations Review

The inspectors periodically reviewed shift logs and operations records, including data sheets, instrument traces, and records of equipment malfunctions. This review included control room logs and auxiliary logs, operating orders, standing orders, jumper logs, and equipment tagout records. The inspectors routinely observed operator alertness and demeanor during plant tours. They observed and evaluated control room staffing, control room access, and operator performance during routine operations. The inspectors conducted random off-hours inspections to ensure that operations and security performance remained at acceptable levels. Shift turnovers were observed to verify that they were conducted in accordance with approved licensee procedures. Control room annunciator status was verified. Except as noted below, no deficiencies were observed.

During this inspection period, the inspectors reviewed tagout (clearance) 2-9310-045 - HVS-6 Fuel Handling Building Fan.

(1) Unit 1 Load Reduction Due to Linear Heat Rate Issue - September 26, 1993

After returning Unit 1 to service following a reactor shutdown to facilitate replacement of the No. 2 governor valve anti-rotation pin, a load reduction from 100% reactor power was commenced at 1:00 a.m. on September 26 because four incore detectors were found in alarm. This load reduction was performed per procedure OP 3200052, Monitoring Linear Heat Rate, and TS 3.2.1.

Step 8.2.3 of OP 3200052 required that with four or more detectors in alarm, the licensee notify Reactor Engineering and I&C within 15 minutes and reduce the linear heat rate to within limits (less than four detectors in alarm) within one hour per

TS 3.2.1. TS 3.2.1 required that with the linear heat rate exceeding its limits as indicated by four or more coincident incore channels or by the axial shape index outside of the power dependent control limits, the licensee initiate corrective actions within 15 minutes to either restore the linear heat rate to within its limits within one hour or be in Hot Standby within the next six hours.

When reactor power reached 92% at 1:20 a.m., one of the four alarms cleared, and the operators exited the action statement. With reactor power maintained at 92%, 2 more alarms cleared at 1:23 a.m., and the last alarm cleared at 1:26 a.m. At 4:30 a.m., reactor engineering took a snap shot of the core and provided new setpoints. Following the insertion of the new setpoints, power ascension was commenced at 4:31 a.m., and 100% reactor power was re-achieved at 5:08 a.m.

The previously existing setpoints had been set during a monthly surveillance performed while at 30% reactor power during the jellyfish influx. In contrast, during startup from refueling, the licensee routinely rechecked the alarms several times as power level increased as part of a broader test program. The licensee concluded that these setpoints are somewhat affected by the power level at which they are set. When set at low power, the alarms are more conservative than intended.

(2) Unit 1 Load Shutdown Due to Jellyfish Intrusion - September 26, 1993

At 7:35 a.m. on September 26, a Unit 1 load reduction from 100% reactor power was commenced due to the intrusion of large quantities of jellyfish into the intake canal. Reactor power was stabilized at 64% at 8:18 a.m., all circulating water pump discharge valves were throttled to 75% open at 8:50 a.m., and a load reduction was re-commenced at 8:53 a.m. Unit 1 was taken off line at 9:49 a.m., and Mode 2 was entered at 9:50 a.m. At 9:00 a.m. on September 27, Unit 1 re-entered Mode 1 and was placed back on line at 10:03 a.m. Reactor power was stabilized at approximately 30% at 10:55 a.m.

(3) Unit 1 Shutdown Due to Jellyfish Intrusion - September 27, 1993

At 3:10 p.m. on September 27, a Unit 1 load reduction from approximately 30% reactor power was commenced due to the intrusion of large quantities of jellyfish into the intake canal. At 3:20 p.m., Unit 1 was taken off line, and Mode 2 was entered. Unit 1 re-entered Mode 1 at 8:20 p.m. and was placed back on line at 9:40 p.m. Reactor power was stabilized at approximately 32% at 11:25 p.m. Power ascension was commenced at 11:45 a.m. on September 28, 1993, and reactor power was stabilized at 40% at 11:58 a.m. Power ascension was re-commenced at 12:19 p.m., and reactor power was stabilized at

approximately 75% at 1:55 p.m. At 10:10 a.m. on September 29, 1993, the licensee commenced another power ascension, and 90% reactor power was achieved at 11:10 a.m. Power ascension was re-commenced at 1:10 p.m., and reactor power was stabilized at approximately 96% for axial shape index considerations at 2:15 p.m. The last power ascension was commenced at 2:20 a.m. on September 30, and rated power was achieved at 3:00 a.m.

(4) Unit 1 72-Hour ECCS LCO - September 28, 1993

At 5:15 a.m. on September 28, the 1B HPSI header was removed from service due to a limit switch problem on the 1B HPSI injection valve to the 1A2 loop (HCV-3616). The control room position indication showed that the valve was open when it was actually closed. The licensee's investigation revealed that the limit switch cartridge pinion gear shaft had failed resulting in a failure of the limit switch assembly. This in turn resulted in the actuator potentially developing stall thrust in the closing direction. The initial engineering assessment of this issue concluded that there would be no concern for the condition of the actuator based on the rebuild of the actuator in place and the successful post-maintenance stroke testing. The valve was successfully tested, and the 1B HPSI header was returned to service at 2:56 p.m. on September 29.

(5) Unit 1 Main Feed Pump Vibration - September 30, 1993

At 2:35 p.m. on September 30, Unit 1 power was reduced from 100% to 45% to investigate vibration readings taken on the 1B MFP under the predictive maintenance program. When power reached 45% at 4:25 p.m., the pump was stopped for repair. The licensee found a problem in the thrust bearing caused by loose internal mounting pins. Tightness of these pins was not discussed in the vendor manual. The predictive maintenance program certainly prevented a major failure in this case. Following repair, the pump was started at 12:25 a.m. on October 2 with subsequent uppower occurring from 1:07 to 5:35 a.m. The unit finished the inspection period at power.

(6) Unit 2 Load Reduction Due to Jellyfish Intrusion - September 26, 1993

At 9:06 a.m. on September 26, a Unit 2 load reduction from 92% reactor power was commenced due to the intrusion of large quantities of jellyfish in the intake canal. Reactor power was stabilized at 55% at 9:40 a.m., another load reduction was commenced at 10:05 a.m., and reactor power was stabilized at 31% at 11:10 a.m. Power ascension was commenced at 12:15 p.m., and reactor power was stabilized at 49% for axial shape index limitations at 2:10 p.m.

(7) Unit 2 Load Reduction Due to Jellyfish Intrusion and a Potential Condenser Tube Leak - September 26, 1993

Due to increasing chloride and sodium levels in the Unit 2 steam generators, the licensee initiated investigation, and entered Action Level 1 of procedure ONOP 2-0610030, Secondary Chemistry - Off Normal, at 2:00 p.m. on September 26. Action Level 1 of this procedure required that, when steam generator sodium or chlorides become greater than 20 ppb, normal values be established within one week or proceed to Action Level 2. At 8:50 p.m., chloride levels in the 2A steam generator were reported to be 103 ppb, and the licensee entered Action Level 2 of procedure ONOP 2-0610030. Action Level 2 of this procedure required that, when steam generator chlorides become greater than 100 ppb, reactor power be reduced to less than or equal to 30% within 4 hours and that normal values be established within 100 hours. As a result of a suspected condenser tube leak in the 2A2 waterbox, the 2A2 circulation water pump was stopped at 9:18 p.m., and a Unit 2 load reduction from approximately 50% reactor power was commenced at 9:28 p.m. During this load reduction, the 2A1, 2B1, and 2B2 circulating water pump discharge valves were throttled to 75% open due to the intrusion of large quantities of jellyfish into the intake canal. Reactor power was stabilized at 29% at 9:46 p.m. Action Level 2 of procedure ONOP 2-0610030 was exited at 10:50 p.m. when the secondary chemistry chloride level was reported to be 87 ppb and decreasing, and Action Level 1 of this procedure was exited at 6:10 a.m. on September 27, when chloride levels were reported to be 12 ppb and 15 ppb in the 2A and 2B steam generators, respectively.

At 6:15 a.m. on September 27, power ascension was commenced, and reactor power was stabilized at 41% at 7:30 a.m. to facilitate the performance of a calorimetric. Power ascension was re-commenced at 7:50 a.m., reactor power was stabilized at 45% at 8:21 a.m., power ascension was re-commenced at 8:49 a.m., and reactor power was stabilized at 55% at 10:00 a.m. due to axial shape index limitations. Power ascension was re-commenced at 10:15 a.m., and reactor power was stabilized at 59% at 10:42 a.m. due to main condenser backpressure limitations. In order to maintain backpressure within its limitations, a load reduction was commenced at 12:00 p.m., and reactor power was stabilized at 53% at 12:50 p.m.

Waterbox cleaning and further investigation revealed potential condenser tube leakage in the 2A2 waterbox. As a result, the licensee utilized helium gas to localize the potential tube leak. No tube leaks were identified. The 2A2 waterbox was returned to service, and the 2A2 circulating pump was restarted at 5:32 p.m. on September 29. In order to detect increases in chloride levels, the licensee also lowered the alarm setpoints. No alarms were received.

Subsequent licensee analysis identified that the air ejector piping had a bolted flange connection inside each water box. Bolts have been found somewhat loosened or missing in the past. Considering that the pipe would heat up significantly while the waterbox was empty and could then squeeze the gasket tight, a leak at this joint might not be found while the waterbox was open for cleaning.

On September 29, while Unit 2 was at reduced load, the licensee also performed turbine valve testing and removed the 2B1 waterbox from service for cleaning. The 2B1 circulating water pump was stopped at 9:07 p.m. and a load increase commenced at 9:20 p.m. Reactor power was stabilized at 57% at 10:20 p.m.

(8) Unit 2 Load Reduction Due to Rupture in Screen Wash System Header - September 29, 1993

A load reduction from 57% reactor power was commenced at 11:15 p.m. on September 29, due to a rupture in the screen wash system header coincident with a high differential pressure across the screen assembly for the 2B2 well. The header ruptured from external corrosion at a threaded joint. Reactor power was stabilized at 22% at 11:57 p.m. Power ascension was commenced at 8:20 a.m. on September 30, was stabilized at 8:35 a.m. to facilitate a feedwater regulating valve transfer, then re-commenced at 9:25 a.m. Reactor power was held at 34% at 10:05 a.m. for continued intake work. Following these activities, power ascension was re-commenced at 10:10 a.m. on October 1, with stops for ASI control, and 100% reactor power was re-achieved at 7:30 a.m. on October 3.

(9) Unit 2 Waterbox Cleaning - October 17 and 18, 1993

Unit 2 downpowered to 63% power on October 17 to clean waterboxes and returned to full power on October 18. Unit 2 finished the inspection period at power.

(10) RCS Unidentified Leak Rate Increases

Operators responded to a number of increases in unidentified RCS leak rate. On October 18, the Unit 1 leak rate reached 1.09 gpm. Operators entered the action statement of TS LCO 3.4.6.2, which requires that, if unidentified leakage exceeds a 1 gpm limit, then reduce the leakage rate to within limits within four hours or be in hot standby within the next six hours. In investigating the cause of the increased leakage, operators found that misaligned sample valves had been diverting coolant from the VCT to the HUT. The sample valves were realigned and leakage fell back within TS limits within the four-hour LCO action statement time.

On October 19, Unit 1 operators noted that RCS leakage had increased from approximately 0.5 to 0.845 gpm. A tour of accessible containment spaces, conducted the same day, indicated a packing leak on the pressurizer steam space sample heat exchanger isolation valve. A second containment entry was made to backseat the valve and adjust the packing. Following this evolution, RCS leak rate dropped to 0.35 gpm.

On October 20, Unit 2 experienced a 1.83 gpm RCS leak rate. Operators entered the action statement of TS LCO 3.4.6.2 and began investigations as to the cause of the increased leak rate. In the course of the investigation, a containment entry identified a packing leak at one of the two pressurizer spray bypass valves. The valve was isolated. Additional leak rate contributors were identified in a sampling system line, the operation of the 2A charging pump, and the 2A charging pump thermal relief valve. Following these leak isolation activities, the Unit 2 RCS leak rate was reduced to approximately 0.5 gpm within the four-hour LCO action statement time.

c. Technical Specification Compliance

Licensee compliance with selected TS LCOs was verified. This included the review of selected surveillance test results. These verifications were accomplished by direct observation of monitoring instrumentation, valve positions, and switch positions, and by review of completed logs and records. Instrumentation and recorder traces were observed for abnormalities. The licensee's compliance with LCO action statements was reviewed on selected occurrences as they happened. The inspectors verified that related plant procedures in use were adequate, complete, and included the most recent revisions.

d. Physical Protection

The inspectors verified by observation during routine activities that security program plans were being implemented as evidenced by: proper display of picture badges; searching of packages and personnel at the plant entrance; and vital area portals being locked and alarmed.

e. Radiological Protection Program

Radiation protection control activities were observed to verify that these activities were in conformance with the facility policies and procedures, and in compliance with regulatory requirements. These observations included:

- Entry to and exit from contaminated areas, including step-off pad conditions and disposal of contaminated clothing;
- Area postings and controls;

- Work activity within radiation, high radiation, and contaminated areas;
- Radiation Control Area (RCA) exiting practices; and,
- Proper wearing of personnel monitoring equipment,
- Proper wearing of personnel monitoring equipment, protective clothing, and respiratory equipment.

The inspectors read an informal publication at the plant titled: "St. Lucie Power Lines, Volume 3, Number 3, September, 1993." It described the August 31 special visit of the Prime Minister of Russia and an entourage of Russian and U.S. Dignitaries to the site in a less than serious manner, and included a statement about plant rules: "Although the tour did not seem particularly organized and uncounted security and health physics rules were abused inadvertently..." The inspectors were aware that certain site security procedures were replaced by alternate methods for the August 31 special visit, with related NRC enforcement discretion, as discussed in IR 335,389/93-20. Inspectors were not aware of any relaxation of health physics (radiation protection) regulations.

The inspectors discussed the matter of health physics rules with the Health Physics Supervisor, who stated that site and NRC health physics rules were followed during the August 31 special visit. To accomplish this, the licensee had made one temporary change to health physics procedure HP-30, Personnel Monitoring. This temporary change provided for the visitors to enter the RCA without each wearing individual dosimetry for monitoring radiation exposure. The inspector reviewed the temporary change, which stated: "At the discretion of the HP Supervisor, those individuals who are visitors and will not exceed 25% of the quarterly limit (312 mc) may enter the RCA without personnel monitoring devices when accompanied by an individual wearing appropriate dosimetry." The inspector verified that the temporary change was in accordance with NRC regulations. The inspector also considered that the RCA tour path and duration (as described by several persons) and other health physics aspects of this special visit were also in accordance with site health physics procedures and NRC regulations.

In summary, the inspectors found that operations were conducted in a safe and professional manner. Operators, confronted with repeated needs to maneuver the units' power levels and modes, performed these functions well. Control room operator attentiveness to plant conditions and trends was a noteworthy strength in identifying and isolating RCS leakage on both units. Radiological controls and general housekeeping continued to be good.

4. Surveillance Observations (61726)

Various plant operations were verified to comply with selected TS requirements. Typical of these were confirmation of TS compliance for reactor coolant chemistry, RWT conditions, containment pressure, control room ventilation, and AC and DC electrical sources. The inspectors verified that testing was performed in accordance with adequate procedures, test instrumentation was calibrated, LCOs were met, removal and restoration of the affected components were accomplished properly, test results met requirements and were reviewed by personnel other than the individual directing the test, and that any deficiencies identified during the testing were properly reviewed and resolved by appropriate management personnel. The following surveillance tests were observed:

- 1B ICW Pump Performance Test per OP 1-0010125A, Revision 32, Data Sheet 18.

- 2C AFW Pump Performance Test per OP 2-0700050, Revision 31.

These tests were effectively performed.

5. Maintenance Observation (62703)

Station maintenance activities involving selected safety-related systems and components were observed/reviewed to ascertain that they were conducted in accordance with requirements. The following items were considered during this review: LCOs were met; activities were accomplished using approved procedures; functional tests and/or calibrations were performed prior to returning components or systems to service; quality control records were maintained; activities were accomplished by qualified personnel; parts and materials used were properly certified; and radiological controls were implemented as required. Work requests were reviewed to determine the status of outstanding jobs and to ensure that priority was assigned to safety-related equipment. Portions of the following maintenance activities were observed:

a. NPWO 8413/61 Excessive Axial Movement - 1B Steam Generator Feed Pump

The 1B feed pump thrust bearing was opened for inspection and correction because the vibration monitoring program had detected a change in vibration amplitude and phase. Additionally, on September 30, the shaft was observed by maintenance engineers to be moving axially about 1/16 inch vice the 0.012-0.016 inch design. Upon disassembly, the end play was 0.045 inch. No obvious problems were found but the end play was only 0.003 inch upon reassembly. With this clue, maintenance found a rocker plate pin cocked in its mounting hole, changing the axial play. This condition was not discussed in the vendor manual. Once the end play was set properly, the pump performed well. The maintenance group plans to include this information in their procedure. The inspector observed portions of the field work, cleanness controls, and material

condition of the thrust bearing. Workmanship and material controls were very good. This event highlights the effectiveness of the predictive maintenance program.

b. NPWO 2038, UHS Air Accumulator Repair

The licensee began work to replace the saddle supports to the UHS air accumulator due to excessive corrosion. The accumulator provides a reserve volume of air for the operation of the UHS valves, which isolate Big Mud Creek from the plant intake canal. The UHS valves are normally shut.

The Instrument Air System provides air, through a check valve, to the subject accumulator. From the accumulator, air is supplied to a header which branches to each of the two UHS valve actuators. Each branch line is isolable from the header by a manually operated valve and, downstream of this valve, contains a four-way solenoid valve which serves to isolate the branch from the header and vent the valve actuator upon an open signal. When the actuator is vented, spring force serves to open the UHS valve. The UHS valves have operability requirements detailed in technical specifications for Units 1 and 2.

To allow for the removal of the air accumulator without opening the UHS valves, Letter of Instruction LOI-T-78, revision 0, "Ultimate Heat Sink Accumulator Tank Repairs," was prepared, which directed the installation of a temporary mechanical jumper around the air accumulator. The jumper was installed by first installing a regulated nitrogen supply to a temporary connection in each branch line between the branch solenoid valve and the UHS valve actuator (V-37226 or V-37227). Each branch line was then isolated from the header, whereupon the accumulator was isolated from the Instrument Air System and bled down to atmospheric pressure. When the accumulator was moved, the jumper was installed, the Instrument Air System supply to the UHS valve actuators was restored and the temporary nitrogen supplies at valves V-37226 and 37227 were isolated. To provide a reserve volume of air to the actuators (previously provided by the accumulator), another regulated nitrogen supply was to be installed via a temporary connection at the air supply header (V-37220).

In tracing the temporary nitrogen supplies installed under LOI-T-78, the inspector noted that the temporary supply which had been installed at V-37226 was disconnected and rerouted to the temporary connection at the air supply header (V-37220). In reviewing LOI-T-78, the inspector found that the LOI did not include steps for rerouting the subject line and that the LOI, in its restoration steps, assumed that this line was still connected at V-37226.

The inspector questioned the system engineer responsible for the LOI as to the acceptability of the apparent departure from the LOI. The system engineer stated that, upon performing the steps of the LOI,

the crew could not obtain a third regulated nitrogen supply for connection to V-37220. The system engineer explained that his decision to reroute one of the existing nitrogen supplies without modifying the LOI was based upon the following factors:

- As the author of the LOI, he was aware of the procedure's intent and felt that the action was not contrary to that intent.
- He planned to personally follow the job and would be available to explain the routing upon commencing restoration activities.
- The decision was discussed with the Unit 1 Assistant Nuclear Plant Supervisor, who agreed that the action would have no ill effects, as the nitrogen supply was isolated from the instrument air system at V-37226.

While discussing the matter with the inspector, the system engineer acknowledged that the configuration of the temporary equipment should agree with the LOI. A third regulated nitrogen source was located and installed.

The inspector found that the actions taken in the installation of the temporary nitrogen sources were technically sound, as was the methodology described in the LOI. As a loss of air pressure to the UHS valve actuators would have resulted in the valves assuming their fail-safe positions (open), plant safety was not compromised. However, in rerouting the subject nitrogen line without first obtaining a change to the LOI, the actual configuration of the UHS valves' air supply was incorrectly documented and the proper return-to-normal following maintenance depended upon a second deviation from the LOI. The inspector spoke with the Technical Manager on the issue of procedural compliance. The Technical Manager acknowledged that a change to the procedure would be in order, given the circumstances, and that the system engineer had been counselled to that affect.

Technical Specification 6.8.1 requires that written procedures be established, implemented, and maintained. Procedure QI 5-PR/PSL-1, revision 53, "Preparation, Revision, Review/Approval of Procedures," section 5.13.2 states, in part, that "all procedures shall be strictly adhered to." The inspector found that the rerouting of temporary nitrogen from V-37226 to V-37220 constituted a cognitive departure from an approved procedure and is identified as violation 335,389/93-22-01.

The inspector reviewed the Unit 1 UFSAR for discussions of the UHS valves and found that the valves and their operation was discussed in section 9.2.7.2.1. Additionally, the air supply to the actuators, including the accumulator, was graphically depicted on Figure 9.2-6f. In attempting to review the 10 CFR 50.59 Safety Evaluation (SE) resulting from the LOI, the inspector was informed

that no SE was performed. Members of the licensee's technical staff stated that, as the jumper and nitrogen supplies were part of a maintenance activity, no Safety Evaluation was required. The inspector was informed that guidance on when to perform SEs was obtained from NSAC 125, "Guidelines for 10 CFR 50.59 Safety Evaluations."

The inspector reviewed NSAC 125 and found that section 4.1.1 states that "maintenance activities are not required to be reviewed under 10CFR50.59 except for those activities that require deviation from a SAR procedure, put the plant in a condition where it functions differently than described in the SAR, or might violate a technical specification." The licensee stated that, in considering the applicability of 10 CFR 50.59 to the modifications made under LOI-T-78; the functional aspects of the UHS valves were considered and found to be unchanged (air was supplied to maintain the valves shut and vented to open). Following initial discussions with the inspector, the plant's technical staff stated that they had consulted with members of FPL's corporate Nuclear Engineering staff, who concurred in the opinion that an SE was not required. The inspector noted that NSAC 125 also states that "Temporary changes to the facility should be evaluated to determine if an unreviewed safety question exists...Examples of temporary modifications include jumpers...used on a temporary basis." When asked why an SE was not performed based upon this guidance, members of the technical staff stated that the actions directed under LOI-T-78 constitutes maintenance, not a temporary change.

The inspector found that changes to the facility as described in Section 9.2.7.2.1 and Figure 9.2-6f had been affected in the implementation of LOI-T-78. These changes included:

- The use of regulated nitrogen sources at valves V-37226 and V-37227 to maintain the UHS valves in a shut position while actuator air supplies were isolated from the accumulator.

- The installation of a mechanical jumper around the UHS air accumulator.

- The use of a regulated nitrogen source at V-37220 to act as a reserve volume of air while the accumulator was removed from the system.

The inspector concluded that no unreviewed safety question existed as a result of the changes detailed above. The UHS valves could have been opened from the control room (as designed) at any time, and the valves' fail-open characteristics were unchanged. While an approximate valve stroke time of 30 seconds is described in the UFSAR, and while the stroke time may have been affected by the modification (due to the increased reserve volume of air available), this time does not factor into accident analyses.

As a result of discussions with the licensee, the inspector concluded that the failure to perform the required SE was the result two causal factors:

- In determining that LOI-T-78 addressed a maintenance evolution (and was therefore not a change to the facility), the licensee failed to differentiate between the work to be performed on the UHS air accumulator and the actions taken to assure continued operability of the UHS valves.

- In considering a change to the facility as a change in component functionality alone, the licensee failed to consider the more basic question of whether or not the facility had been physically changed from its description in the UFSAR.

The inspector reviewed portions of the licensee's administrative program for conformance to the requirements of 10 CFR 50.59. The following procedures were reviewed:

- QI 5-PR/PSL-1, Rev. 53, "Preparation, Revision, Review/Approval of Procedures"
- QI 3-PR/PSL-1, Rev. 29, "Design Control"
- AP 0010124, Rev. 29, "Control and Use of Jumpers and Disconnected Leads"
- AP 0005769, Rev. 0, "10 CFR 50.59 Safety Evaluation Guidelines"

The inspector found that the procedures correctly required reviews for 10 CFR 50.59 applicability and adequately assigned preparation, review, approval, and reporting responsibilities. AP 0005769 contained guidance for determining when a change to the plant exists which was consistent with NSAC 125. The inspector found that this guidance was consistent with 10 CFR 50.59. Given the adequacy of the licensee's administrative program and the reported consistency of opinions between site and corporate engineering organizations, the inspector concluded that an interpretive weakness exists on the part of the licensee with respect to the identification of plant changes. This perceived weakness does not imply that the licensee has conducted unsatisfactory SEs, only that the potential exists that an inadequate number of SEs are being performed.

10 CFR 50.59(b)(1) requires, in part, that records of changes to the facility as described in the safety analysis report be maintained and that such records include a written safety evaluation which provides the basis for the determination that the change does not include a unreviewed safety question. The failure to perform and document an SE for LOI-T-78 is identified as violation 335,389/93-22-02.

The work performed under NPWO 2038 to repair the UHS accumulator saddle supports was reviewed by the inspector. At the end of the inspection period, the accumulator saddle supports had been ground free of the accumulator and the embedded plates in the UHS

foundation. New saddle supports were fabricated and corrosion damage to the plates and to the accumulator were evaluated visually and ultrasonically. Weld repairs were made to the embedded plates and the need for repairs to the accumulator was being evaluated by corporate engineering. The inspector found the licensee's actions in these areas to be thorough and appropriate.

In summary, maintenance activities continued to be performed in a professional manner. The detection and correction of changes in the performance of the 1B MFP highlight the effectiveness of the predictive maintenance program. Violations were identified which involved procedural compliance and the applicability of 10 CFR 50.59 to a procedure prepared to support UHS accumulator repair. The inspectors concluded that the issue of procedural compliance did not represent a programmatic shortcoming. The inspectors found that the failure to prepare an SE for the noted procedure highlighted an interpretive error on the part of the licensee of the requirements of 10 CFR 50.59.

6. Fire Protection Review (64704)

During the course of their normal tours, the inspectors routinely examined facets of the Fire Protection Program. The inspectors reviewed transient fire loads, flammable materials storage, housekeeping, control hazardous chemicals, ignition source/fire risk reduction efforts, and fire barriers.

While touring the Unit 1 auxiliary building, the inspector noted that fire door RA-4 (access to the B LPSI pump room) was open and unattended without a posted fire barrier breach request. Air and vacuum hoses were run through the door in support of painting which was being conducted in the room. The inspector notified the painting supervisor responsible for the work of the noted condition. After investigating the situation, the supervisor informed the inspector that the paint crew working in the B LPSI room had mistook the breach request posted adjacent to door RA-3 as the permit which applied to their work. Door RA-3 is located in close proximity to door RA-4. A new breach request was promptly prepared and posted.

In Summary, the inspectors found that appropriate fire protection practices were in place. One case of a failure to properly obtain a fire barrier breach permit was identified and was promptly corrected by the licensee.

7. Onsite Followup of Written Nonroutine Event Reports (Units 1 and 2) (92700)

LERs were reviewed for potential generic impact, to detect trends, and to determine whether corrective actions appeared appropriate. Events that the licensee reported immediately were reviewed as they occurred to determine if the TS were satisfied. LERs were reviewed in accordance with the current NRC Enforcement Policy.

a. (Closed - Unit 2) LER 389/91-001, Inadvertent Actuation of Auxiliary Feedwater Components While Performing Monthly Auxiliary Feedwater Actuation System Test Due to Equipment Failure.

With Unit 2 operating at 100% reactor power on March 4, 1991, an inadvertent actuation of Channel A AFW components occurred during the performance of the AFAS monthly functional test per I&C procedure 2-0700051, Auxiliary Feedwater Actuation System Monthly Functional Test. I&C was balancing and adjusting the Channel A auctioneered power supplies to the AFW actuation relays at the time. When the components actuated, trip status and lockout status lights were lit, several AFAS-related annunciations occurred, the 2A AFW pump started, the steam admission valve from the 2B SG to the steam-driven 2C AFW pump opened and the 2C pump started. However, the discharge valves for both pumps remained closed, so AFW did not enter either steam generator. MFIV A also received a close signal, but it only moved slightly from its full open position in the 0.21 seconds before the signal cleared. Operators instructed I&C to stop testing, identify any equipment out of normal configuration, and return the plant to its normal configuration.

Extensive troubleshooting revealed that the initiating event was the momentary loss of power from the two auctioneered power supplies serving channel A. In this circuit, two power supplies are auctioneered through diodes such that the power supply with the higher voltage supplies the load. As the voltage of the two power supplies varies with respect to each other, the higher voltage power supply will assume the load from the other one. Power supply PS-302B was found to be faulty. The procedural methodology involved in balancing and adjusting power supplies PS-301A and PS-302B, combined with the PS-302B failure, momentarily resulted in the auctioneered voltage output level being less than that specified for system operation. The root cause of the event was determined to be the failure of one power supply to pick up load from the other power supply. In addition, after reviewing the procedure and technical manuals, the licensee determined that the "monthly" power supply adjustments were not intended by the vendor to be performed on a monthly basis. The licensee also determined that the AFAS was able to perform its intended safety function at all times during this event.

As a result of this event, I&C personnel replaced the faulty power supply on March 6, 1991. The AFAS monthly functional test was also satisfactorily completed on March 8, 1991. Engineering evaluated the need for replacement of the AFAS power supplies for both units with an improved model, and the power supplies have since been modified on both units. I&C personnel changed the surveillance procedures to match the testing frequency recommended by the technical manual and required by the TS. As a result, at-power AFAS power supply testing was suspended, and 18-month surveillance procedure IMP-09.03, AFAS Power Supply Calibration Instruction, was instituted. As a generic response to difficulties experienced with

the AFAS and other sensitive systems, the licensee also formed a cross-functional task team to review past events and identify improvement opportunities.

The inspector's verified that the licensee's corrective actions have been completed. This item is closed.

b. (Closed - Unit 2) LER 389/91-006, Engineered Safety Features Actuation Channel Out of Service Due to Personnel Error.

This event was mentioned in paragraph 2.c of IR 335,389/91-22 and was discussed in detail in paragraph 6.a of IR 335,389/91-27. NCV 389/91-27-02, Engineered Safety Features Actuation Channel Out-of-Service Due to Personnel Error, was previously issued on February 25, 1992, as a result of this event. This item was kept open pending the completion of the licensee's three following corrective actions: open item notice 91-26 (2) requesting a Training Department evaluation of the event as a training item, open item notice 91-26 (4) requesting review of the equipment out-of-service process, and open item notice 91-26-(50) for human factors oriented modification of the bypass key.

This LER was evaluated by the Training Department to determine the appropriate training requirements and methods and is being tracked by Training System Action Request No. 9201025. The licensee strengthened the procedural process governing the review of equipment placed out-of-service by the installation of key identifiers on the RAS and CSAS keys for Unit 2 and by the placement of emphasis on the NPS and ANPS for more thorough reviews of all paperwork concerned with the operation of the units. This was further promulgated through NPS/ANPS meetings, correspondence of expectations, and additional event meetings. In addition, the licensee modified the RWT level bypass key with a human factors identification tag to highlight its unique TS action statement.

The inspectors verified that the licensee's corrective actions have been completed. This item is closed.

c. (Closed - Unit 2) LER 389/92-005, Reactor Trip From 100% Power on (Loss of Load) Caused by a Design Error in the Turbine Trip Testing On-Line Modification.

This event was discussed in detail in paragraphs 2 and 3.b.(12) of IR 335,389/92-11. The licensee redesigned the turbine trip test modification, tested it on a fossil plant turbine, installed it in St Lucie Unit 1, and uses it for the monthly turbine trip surveillance test. The inspector witnessed the successful performance of the subsequently-corrected design on September 11, 1993, and discussed the test in IR 335,389/93-20, paragraph 4.b. The inspectors verified that the licensee's corrective actions have been completed. This item is closed.

d. (Closed - Unit 1) LER 335/93-007, Three Manual Reactor Trips to Prevent Equipment Damage by Jellyfish Influx.

These events were discussed in paragraph 3.b. of IR 335/93-20. The LER accurately described the events and corrective actions. This LER is closed.

8. Onsite Followup of Events (Units 1 and 2)(93702)

Nonroutine plant events were reviewed to determine the need for further or continued NRC response, to determine whether corrective actions appeared appropriate, and to determine that TS were being met and that the public health and safety received primary consideration. Potential generic impact and trend detection were also considered. Events involving large influxes of jellyfish are discussed in paragraph 3.b.

9. Followup of Regional Requests - Inspection of Leak Sealant Practices (Units 1 and 2) (92701)

a. Does the licensee use temporary leak sealant? If so, give the trade name and describe the process.

- Yes, the licensee uses temporary leak sealant.
- The trade name is "Leak Repair, Inc.", a subsidiary of Team, Inc.
- The process uses an injectable material which is injected into the joint through a hole drilled in the component, or around the joint through a hole drilled in a manufactured barrier.

b. Is it used on safety-related equipment? Nonsafety-related equipment? Are there any prohibitions on its use?

- Yes, it is used on safety-related equipment.
- Yes, it is used on nonsafety-related equipment.
- There are no universal prohibitions on its use other than ASME Code requirements.

c. How is the use controlled administratively? Are licensee procedures used? Are contractor procedures used? Is it treated as maintenance? Modification?

- Its use is primarily controlled administratively by a site administrative procedure ADM-08.01, Rev 2, On-Line Leak Sealant Procedure. That procedure, however, invokes other procedures such as the Nuclear Plant Work Order procedure, Nonconformance Report (NCR) procedure, and Chemical Control procedures.
- Licensee procedures are used as discussed above.

- Manufacturer's procedures are used for the application. The manual has been reviewed and approved for use by engineering and by the site Facility Review Group.

- The process is basically treated as maintenance vice a modification. For safety-related components or systems, a NCR is sent to engineering. The engineering response provides the analysis of operability and special steps that might be required.

d. Does the licensee control the type and amount of injected material? If so, how?

- The licensee used the NCR response to control the type and amount of material injected for safety-related applications. Nonsafety-related applications are watched by mechanical maintenance supervisors.

e. How is the procedure reviewed for reactor and personnel safety issues? By the PORC (or equivalent)?

- Yes, the procedures have been reviewed by the site equivalent to the PORC termed the Facility Review Group (FRG).

f. What is the licensee's policy on length of use?

- For safety-related applications, the NCR response addresses ultimate repair.

- For nonsafety-related applications, no hard policy was found. The licensee states that they prefer to replace the component at the next opportunity.

- It is noted that a permanent repair work order is required from the onset as well as the work order for the temporary repair. This helps keep the need for permanent repair visible.

g. Determine how involved the QA and engineering organizations are in preparation, witnessing, and post use audits.

- Engineering reviewed the contractor's procedures and responds to the NCRs, specifying the type repair allowed for safety-related applications. This site has a number of engineers attached to the mechanical maintenance shop itself. They are the contract administrators for the leak repair contract. The nonsafety-related applications are controlled by engineers not from the design organization, but using procedures approved by the design organization.

h. Is plant management aware of the extent of use and any significant issues resulting from use of temporary leak sealants.

- Yes, plant management is aware. A recent study by the mechanical shop engineers analyzed leak repair applications for the past several years with the goal of pointing out opportunities for improved permanent repairs such that temporary on-line repairs would be minimized. There have been design changes such as replacing sight glass columns with sealed units, and replacement of small valve types with more reliable valves. As a result, the use of temporary on-line repair has decreased significantly over the last three years.

10. Exit Interview

The inspection scope and findings were summarized on October 22, 1993, with those persons indicated in paragraph 1 above. The inspector described the areas inspected and discussed in detail the inspection results listed below. Proprietary material is not contained in this report. Dissenting comments were not received from the licensee.

Item Number	Status	Description and Reference
335,389/93-22-01	open	VIO - Failure to Follow Procedure for UHS Valves Air Supply Maintenance, paragraph 5.b.
335,389/93-22-02	open	VIO - Failure to Perform and Document a 10 CFR 50.59 Safety Evaluation for Temporary Modifications to UHS Valves Air Supply, paragraph 5.b.

11. Abbreviations, Acronyms, and Initialisms

AC	Alternating Current
AFAS	Auxiliary Feedwater Actuation System
AFW	Auxiliary Feedwater (system)
ANPS	Assistant Nuclear Plant Supervisor
AP	Administrative Procedure
ATTN	Attention
CFR	Code of Federal Regulations
CSAS	Containment Spray Actuation System
DC	Direct Current
DPR	Demonstration Power Reactor (A type of operating license)
ECCS	Emergency Core Cooling System
ESF	Engineered Safety Feature
FPL	The Florida Power & Light Company
HCV	Hydraulic Control Valve
HP	Health Physics
HPSI	High Pressure Safety Injection (system)
I&C	Instrumentation and Control
IR	[NRC] Inspection Report
LCO	TS Limiting Condition for Operation
LER	Licensee Event Report
LOI	Letter of Instruction

LPSI	Low Pressure Safety Injection (system)
MFIV	Main Feed Isolation Valve
MFP	Main Feedwater Pump
NCV	NonCited Violation (of NRC requirements)
No.	Number
NPF	Nuclear Production Facility (a type of operating license)
NPS	Nuclear Plant Supervisor
NPWO	Nuclear Plant Work Order
NRC	Nuclear Regulatory Commission
NSAC	Nuclear Safety Analysis Center
ONOP	Off Normal Operating Procedure
OP	Operating Procedure
ppb	Part(s) per Billion
PSL	Plant St. Lucie
Pub	Publication
QA	Quality Assurance
QI	Quality Instruction
RAS	Recirculation Actuation Signal
RCA	Radiation Control Area
RWT	Refueling Water Tank
SAR	Safety Analysis Report
SE	Safety Evaluation
SG	Steam Generator
St.	Saint
TS	Technical Specification(s)
UFSAR	Updated Final Safety Analysis Report
UHS	Ultimate Heat Sink
URI	[NRC] Unresolved Item
VIO	Violation (of NRC requirements)