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

Report Nos.: 50-250/85-03 and 50-251/85-03

Licensee: Florida Power and Light Company
9250 West Flagler Street
Miami, FL 33101

Docket Nos.: 50-250 and 50-251 License Nos.: DPR-31 and DPR-41

Facility Name: Turkey Point 3 and 4

Inspection Conducted: January 21-25, 1985

Inspector: W. J. Ross 2/11/85
W. J. Ross Date Signed

Approved by: J. J. Blake 2/13/85
J. J. Blake, Section Chief Date Signed
Engineering Branch
Division of Reactor Safety

SUMMARY

Scope: This routine, unannounced inspection entailed 41 inspector-hours in the areas of plant chemistry and inservice testing (ISI) of pumps and valves.

Results: No violations or deviations were identified.

REPORT DETAILS

1. Licensee Employees Contacted

*K. W. Harris, Vice President, Plant Turkey Point
C. Baker, Plant Manager, Nuclear
*J. A. Labarrague, Acting Plant Manager
*B. Abrishami, Acting Superintendent, Technical Department
*J. Arias, Supervisor, Regulatory & Compliance
*A. Gould, Chemistry Specialist, FP&L General Office
*E. LaPierre, Radiochemist, Chemistry
*J. Mack, IST Engineer, FP&L General Office
*D. E. Meils, Laboratory Supervisor, Chemistry
*J. Seager, Water Treatment Supervisor, Chemistry

Other licensee employees contacted included four technicians and one control room operators.

NRC Resident Inspectors

*T. Peebles
R. Brewer

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on January 25, 1984, with those persons indicated in paragraph 1 above. The licensee acknowledged the inspection results and committed to provide additional information on the item discussed in Section 6c of this report within a week of the exit interview.

The licensee did not identify as proprietary any of the materials provided to or reviewed by the inspectors during this inspection.

Inspector Followup Item 50-250/85-03-01, Pressure Isolation Valves Incorrectly Designated in Technical Specifications.

Unresolved Item 50-251/84-03-02, Throttling of RHR Discharge Stop Valves.

3. Licensee Action on Previous Enforcement Matters

This subject was not addressed in the inspection.

4. Unresolved Items

Unresolved items are matters about which more information is required to determine whether they are acceptable or may involve violations or deviations. The unresolved item identified during this inspection is discussed in paragraph 6c.

5. Plant Chemistry (92706)

The inspector reviewed the operational history of the two nuclear units at Turkey Point since his previous inspection in February 1984, and reassessed the licensee's capability of maintaining the integrity of the primary-coolant pressure boundary. The inspector also reviewed actions taken by the licensee to minimize degradation of the steam generators in Unit 3 as the result of condenser-tube failure two days before this inspection.

a. Assessment of Operational Actions

Both Unit 3 and 4 completed most of a fuel cycle since the inspector's last inspection. Unit 3 returned to power from the most recent reload in December 1984, and Unit 4 is scheduled for refueling in April 1985. No operational problem, except the shutdown of Unit 3 on January 19, 1985, was attributed to chemical reasons or corrosion. The steam generators in Unit 4 were sludge lanced and visually examined during the March 1984 refueling outage for the unit. The inspector was informed that even less solids were removed from the Unit 4 steam generators than had been removed from Unit 3 (<50 pounds) after the first cycle with new steam generators. Photographs of the tube sheets revealed essentially no particulates. It is evident that the licensee's endeavors to minimize transport of corrosion products to the steam generator and to maximize the efficiency of steam generator blowdown have been successful.

The inspector further evaluated the licensee's ability to maintain the integrity of the secondary water cycle, with special emphasis on problem areas perceived during his previous inspection.

(1) The inspector was informed that efforts are still underway to assure that an acceptable level of dissolved oxygen in the condensate/feedwater is maintained when high rates of steam generator blowdown are required (i.e., blowdown equal to one to six percent of feedwater flow). The degassifier that was installed on the Demineralized Water Storage Tank (DWST) during 1984 is not operating efficiently, and, even with a nitrogen atmosphere within the DWST, the water in this tank contains part-per-million concentrations of dissolved oxygen. The oxygen content is reduced when water from the DWST is pumped into the condenser hot wells as makeup; however, it is not reduced when DWST water is transferred to the Condensate Storage Tank (CST) and

subsequently used during plant startup as suction for the auxiliary feedwater (AFW) pumps. Consequently, unless hydrazine is injected into the AFW, the steam generators could be subjected to undesirably high concentrations of oxygen.

(2) The condensate polishing systems, that were installed on each unit when the steam generators were replaced, are operated primarily as cleanup systems during unit startup. After the desired quality of feedwater is achieved, the licensee bypasses the polishers and removes the resins from the polisher elements. This action is taken so that the feedwater will not be contaminated by "throw" of sodium, chloride, or sulfate from the resins and, also, so that the pH of the feedwater can be increased, within the allowable 9.0-9.6 pH range, thereby reducing the possibility of corroding iron from the large carbon-steel pipes.

(3) The licensee has endorsed the recommendations of the Steam Generator Owners Group (SGOG) and the Electric Power Research Institute (EPRI) for controlling the chemistry in the secondary water cycle. The inspector reviewed Operating Procedure 1560, Secondary Chemistry Control and Limits, and established that "holds" are placed on power escalation during startup to ensure that both the low-pressure components (condensate/feedwater) and high-pressure (extraction steam and drain) lines do not cause contamination of the water that is pumped into the steam generators. The inspector observed the manner with which this Operating Procedure, as well as Operating Procedure 1568.1, Off-Normal Operating Procedure, were implemented during recovery from a condenser tube leak event (see Section 5.b below). The inspector was informed that plans are being considered to add a sampling point on the high-pressure feedwater drain tank so that the quality of water in the tank (i.e., the degree to which the extraction steam lines and drains from the moisture separator and reheater have been cleaned) can be monitored before this water is cycled forward to the feedwater pump (during startup when the reactor power level has been increased to ~30 percent).

(4) The inspector observed that the remodeling work on the relatively small chemistry laboratory had been completed. However, several portions of the laboratory ceiling had been removed to allow additional plant modifications to be made. The licensee had installed a temporary plastic cover over the state-of-the-art ion chromatograph. As was discussed in the inspector's earlier evaluation (Inspection Report 50-250 and 251/84-06, March 8, 1984), this laboratory and the outdoor sampling station are not considered adequate for maintaining the stringent monitoring program recommended by the SGOG/EPRI guidelines. Even though the

steam generators have been kept free of iron oxides and other potential solid corrodants, the SGOG/EPRI guidelines emphasize the capability to detect soluble corrodant species, such as chloride and sulfate ions, in trace amounts (ppb or less). The licensee has initiated a plant improvement program that included the construction of some new buildings; however, no commitment was made relative to improving the Chemistry Group's capability for sampling key chemical parameters from the secondary cycle. Therefore, the inspector will leave open Inspector Followup Item 84-06-01, Secondary Water Sampling Points.

b. Contamination of Steam Generator Water from Condenser Tube Failures

At approximately 5:00 a.m. on January 19, 1985, the Unit 3 control room operator observed, by means of a chart recorder on the control board, that the cation conductivity in the steam generators and in the condensate headers was increasing and had exceeded the level (7 umhos/cm) that indicated a condition which might result in rapid steam generator corrosion during continued operation. When the cation conductivity ion the steam generator was verified by analysis to actually be ~600 umhos/cm and to indicate inleakage of condenser cooling water through a specific section of the hotwell, the control room operators began implementing the actions required by Off-Normal Operating Procedure 1568.1. These actions included isolating the affected water box of the hotwell and reducing power from 100% to 0%. During the controlled shutdown, the reactor tripped at ~10% power as the result of turbine trip. By 7:40 a.m. the cation conductivity in the steam generator water had been decreased to 50-70 umhos/cm by means of increased blowdown, use of the condensate polishers, and continuous makeup of condensate. At this time the cation conductivity at the influent and effluent of the polishers was ~1.2 umhos/cm and ~0.23 umhos/cm respectively, showing that high quality feedwater was again being supplied to the steam generators.

The cause of the inleakage was identified as failure of two condenser tubes. Although the cause of failure had not been established, the control room operators reacted to the inleakage as if it were caused by ruptured tube. Both of the failed tubes, as well as other condenser tubes in the immediate vicinity of the failures, were plugged to isolate the leaks. The licensee was fortunate in that, although the condensate cleanup system was bypassed, the polisher elements were still precoated and could be placed into service immediately after the inleakage was detected.

The inspector concluded that the licensee controlled this event as directed in Operating Procedures 1560 and 1568.1 and followed the corrective measures recommended by the SGOG/EPRI Guidelines. As a result, the equivalent of a 5ppm of sodium chloride was flushed from the steam generators in ~3 hours. These events, however, emphasize the

SGOG/EPRI recommendations for prompt action to minimize the detrimental effect of corrosive ions on the generator tubes. It also emphasizes the SGOG/EPRI Guidelines recommendations that timely maintenance be preformed on monitoring equipment. Although the proper corrective action was taken as soon as the abnormal situation was detected, the cation conductivity charts in the control room indicate that the tube leaks began about 2:00 a.m. and the first Action Level limit (cation conductivity equal. to 0.8 umho/cm) was exceeded by 3:15 a.m. The latter event occurred unnoticed because the alarm on the control board malfunctioned and because the control room operator did not monitor these charts until about 5:00 a.m.

Responsibility for detecting abnormal occurrences in the secondary system and initiating the appropriate corrective action has been delegated to both Chemistry and Operations personnel. However, the cation conductivity recorders in the control room afford the best means of detecting a sudden transients as well as trending a slower developing abnormal chemistry condition. There are inline monitors for cation conductivity in the two condensate polisher control rooms; however, these monitors are inoperable when the polishers are bypassed and, therefore, not available to Chemistry personnel.

The inspector discussed these concerns with the licensee during the inspection and the exit interview.

c. Audit of Technical Specification Requirements

The inspector audited the results obtained for the concentrations of oxygen, chloride, and fluoride in the reactor coolant system during the period of September through November 1984, and found that the limits set in Technical Specifications had been met during this period.

During this inspection and review of plant chemistry no violations or deviations were identified.

6. Inservice Testing of Pumps and Valves (92706)

As part of a review and inspections of the licensee's program to fulfill the requirements of Section XI of the ASME Boiler and Pressure Vessel Code (the Code), the inspector performed the following activities.

- Discussed with members of the plant Technical Department specific requests for relief from the Code that are now under review by the NRC (NRR)
- Briefly reviewed the licensee's administration of the Turkey Point Pump and Valve Test Program
- Audited results of tests on valves in LPSI (RHR) and HPSI systems

a. Requests for Relief from ASME Code Requirements

The licensee requested that the inspector discuss the findings of a recent inspection by Region II relative to the review of selected requests for relief (Inspection Report Nos. 50-250/84-37 and 50-251/84-38, December 4, 1984). All of the licensee's requests for relief are currently under review by the NRC (NRR). During the discussions the inspector elaborated on the NRC staff's interpretation of certain Code requirements, and the licensee provided new information that clarified or, in some cases, changed the licensee's bases form relief. The inspector informed the licensee that the Region II and the NRR reviewers of this discussion would be informed of the topics discussed and he recommended that the NRR reviewer be formally apprised of any desired changes in the bases for relief requests.

b. Review of the Licensee's Pump and Valve Program

Through discussions with members of the licensee's Technical Department and review of selected procedures, especially the licensee's pump and Valve Program and Operating Procedure 0209.1 and the appendices to the procedure, the inspector established that the required administrative and technical instructions have been developed by the licensee to implement Code requirements for testing pumps and valves.

c. Audit of Valve Operability Test Results

The inspector reviewed the results of operability tests that had been performed on valves in the Residual Heat Removal System (RHR) and in the High Head Safety Injection System (SI). The inspector observed that two valves in Unit 3 that perform primary-coolant pressure-isolation functions and provide protection from an intersystem LOCA are not included in Table 3.16-1 of the Technical Specifications as having special leak rate limits and requiring special surveillance. The licensee agreed that these valves, 3-875C and 3-876B, are incorrectly identified in Table 3.16-1 as 3-875B and 3-876A. The licensee committed to make the necessary corrections as part of the next revision to the Technical Specifications. Because of the importance of the safety function of these pressure isolation valves, the inspector considers that this possible cause for confusion in the surveillance of these two valves should be removed as soon as possible. The licensee should also review the test records to verify that these two valves actually have been leak-rate tested per the requirements of the Technical Specification. Pending completion of these actions, this matter is designated for followup as Item 50-250/85-03-01, Pressure Isolation. Valves Incorrectly Designated in Technical Specifications.

During his audit of RHR valve-operability test results the inspector observed that the most recent test (October 8, 1984) of RHR valve 4-872 in Unit 4 indicated that the stroke time (11.2 seconds) had increased

more than 100% from the previous test (3.3 seconds). Further review of the operational/test history of this valve revealed that initially (1977-1978), the valve opened in approximately 10 seconds. In March 1978, the valve was modified so that it could open only two inches, approximately one-fourth of its former stroke. The valve was operated in this condition until April 1984, with test stroke times of ~3.5±0.5 seconds. Additional work was performed on this valve in April 1984, to correct unsatisfactory seat leakage. Subsequent tests in May, June, and October resulted in stroke times of 11.2±0.1 seconds. The inspector requested that the licensee review the test and maintenance history and determine if the design function of the valve and the alternative RHR flow path had been degraded when the stroke was limited to two inches. The licensee was also asked to establish the reason that the valve was throttled in 1978 and determine why the current stroke time is again ten seconds.

During the exit interview the inspector was informed that the valve was modified in 1978 in response to an NRC (NRR) letter dated June 30, 1977. In this letter the licensee was requested to determine if throttle valves were used both to obtain the analyzed flow distribution between the SI and RHR systems and to prevent total pump flow from exceeding runout conditions when the system is in its minimum resistance configuration. The letter also requested that the licensee determine if the Turkey Point Technical Specifications needed to be revised to incorporate any new surveillance to provide assurance that proper ECCS flows would be maintained in the event of a LOCA. The licensee informed the inspector that additional background information would be provided within the next week.

On January 30, 1985, the inspector was advised by the NRC Senior Resident Inspector (SRI) at Turkey Point that the following additional information had been given to him by the licensee. In response to the NRC letter of June 30, 1977, the licensee performed the necessary analyses and, as a consequence, proposed to throttled the stop valve in the normally used RHR discharge header (Valve 4-758), by installing mechanical stops, to ensure that run out protection was provided for the RHR pumps. The licensee's proposal was approved by the NRC (NRR) without any revisions to the Technical Specifications. The licensee stated that no records have been identified to show that valve 4-872 was considered in the analysis or in the approval of throttling valve 4-758. However, both valves were throttled during the same time period.

The licensee has now committed to make the necessary analyses and submit the results to NRC for review and approval. This commitment still leaves several concerns unanswered:

- Is valve 4-872 currently throttled? If it is, how is it throttled?

- Was a review made pursuant to 10 CFR 50.59 prior to throttling valve 4-872 and operating the plant with the valve throttled?

- Can the RHR system perform its design ECCS-LOCA function with valve 4-872 open full or throttled to 25% flow?

Pending satisfactory response to these questions, this matter is designated as Unresolved Issue 50-251/84-03-02, Throttling of RHR Discharge Stop Valves.

Within the areas examined no violations or deviations were identified.