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

Report Nos.: 50-335/93-18 and 50-389/93-18

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: June 27 - July 31, 1993.

Inspectors: Kerry D. Landis 8/27/93
for S. A. Elrod, Senior Resident Inspector Date Signed

Kerry D. Landis 8/27/93
for M. A. Scott, Resident Inspector Date Signed

Approved by: Marvin V. Sinkule 8/27/93
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, and fire protection review. Backshift inspection was performed on June 28, 29, and July 7, 10, 12-14, 19, 21, 24, and 31.

Results: Operations: Operators conducted operations for each unit in a routine manner during this period. Operators demonstrated alert operation by identifying a small RWT leak.

Maintenance: Maintenance was generally well controlled and well performed. Maintenance was performed in a timely manner to support plant operations. One instance was found by the licensee where a seal was not previously reinstalled by a maintenance person. Surveillances were performed in a professional manner.

Engineering: During this period, engineering evaluations regarding refueling water tank operability and motor operated valve operability which were important to proper operation of the units were timely and technically sound.

Within the areas inspected, the following non-cited violation was identified:

NCV 335/93-18-01, Failure to Follow Motor Operated Valve Maintenance Instructions, paragraph 5.c.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

D. Sager, St. Lucie Plant Vice President
* G. Boissy, Plant General Manager
J. Barrow, Fire/Safety Coordinator
H. Buchanan, Health Physics Supervisor
* C. Burton, 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
* R. Englmeier, Site Quality Manager
H. Fagley, Construction Services Manager
R. Frechette, Chemistry Supervisor
* J. Geiger, Nuclear Assurance Vice President
* J. Holt, Plant Licensing Engineer
* L. Rogers, Instrument and Control Maintenance Department Head
* L. McLaughlin, Licensing Manager
G. Madden, Plant Licensing Engineer
A. Menocal, Mechanical Maintenance Department Head
J. Scarola, Site Engineering Manager
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

* S. Elrod, Senior Resident Inspector
* M. Scott, Resident Inspector

* Attended exit interview

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

2. Plant Status and Activities

Unit 1 began and ended the inspection period at power.

Unit 2 began and ended the inspection period at power. Power was reduced on July 5, 13, and 28 for water box cleaning and July 27 for turbine valve testing.

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 that equipment material conditions were satisfactory:

- Unit 1 RWT,
- Unit 1 and 2 DEH platforms, and
- Unit 1 and 2 4160 and 480 Volt load centers and associated under-voltage relays.

The inspector confirmed that the system lineups met operability requirements and that material conditions were satisfactory.

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 the following tagouts (clearances):

- 1-93-06-142 1B Purification Ion Exchanger, and

- 1-93-07-23 MV 09-10 repair.

(1) During a log data review on June 25, St. Lucie licensed operators identified a slow loss of inventory from the 525,000 gallon Unit 1 RWT. Based on RWT level trend data, RWT inventory had begun to drop by 0.6 to 1.5 gpm about June 15. The leak rate was nearly constant throughout the discovery and repair period which are described below. A total of approximately 55,000 gallons leaked out of the RWT into the ground before the leak was stopped. Analysis showed that the heavier radiological elements were contained in the soil under the tank. The lighter element tritium, while detectable, remained close to the tank.

After the licensee found that the tank was leaking, they made continual efforts to find and stop the leak. Both the RAB piping and the tank level indication were thoroughly investigated. Pipes from the RWT to various locations, including the ECCS headers, were individually isolated. An operator was stationed at the ECCS header valves during isolation. The licensee could not find a leak location external to the tank.

Water wells of various depths had previously been sunk near the RWT in response to a 1992 underground fuel oil leak from an EDG fuel oil line. Since the licensee found no visible external RWT leakage, they sampled these wells to assess the possibility of the RWT leaking through the bottom. Beginning July 6, well samples indicated RWT leakage into the sand beneath the tank.

The RWT bottom is one-quarter-inch-thick aluminum plate welded as described in FPL drawing 8770-G-4545. The tank bottom rests on a soft fill material cushion with compacted fill beneath it as described in FPL drawing 8770-G-671. The earth fill provides the main support for the tank bottom itself, but not the tank sides or top. They are supported by an eight-foot-deep open-ended concrete cylinder beneath the tank perimeter. The tank was built to ANSI specification B96.1-1973, Specification for Welded Aluminum-Alloy Field-Erected Storage Tanks.

Upon finding actual tank leakage, the licensee initiated the following:

- Issued safety evaluation JPN-PSLP-93-0520 on July 9, then revised it on July 15;

- Erected scaffolding by the tank to facilitate using a robot submersible for inspection purposes;

- Ultrasonically inspected the tank inside and out between July 14 and 17; and

- When the (3/16 inch diameter) hole was found, the licensee repaired it using epoxy and an aluminum plate.

Based on the low leak rate, the initial inspections performed with the NRC inspector present, and engineering evaluation JPN PSL SENP 035, Rev 0, dated July 10, the tank remained operable throughout the physical inspection and repair period. The inspector viewed the entire tank bottom using the submersible camera and found no visual indications of major tank integrity problems. Additionally, the inspector reviewed sonic and ultrasonic leak detection data that supported the RWT integrity conclusion. The leak rate determined from trend data had been nearly constant, which also supported the integrity conclusion. The tank contained 34 feet of borated water, which exceeded the 28-foot TS requirement. Makeup capacity to the tank was not a concern in that, the sustained makeup capacity to the RWT of approximately 100 gpm was available if needed.

On July 16, the licensee found and repaired the Unit 1 RWT leakage. A 3/16 inch hole was in the tank bottom. Eight sound transducers, part of a computer enhanced technology, were used around the outside of the RWT. The sonic listening devices were used to identify areas to look for the leak. A diver inside the RWT was using plastic sheets to temporarily seal, and thus identify, possible leakage points. Stopping a leak would reduce flow noise. While the diver was unfolding a plastic sheet, his knee inadvertently covered the hole in the bottom of the RWT and the flow noise stopped. The licensee repaired the RWT by epoxying an aluminum plate over the hole. Additionally, the wall thickness of the remaining tank bottom was characterized by ultrasonic testing. Engineering evaluation JPN PSL SENP 93 035, Rev 1, July 15, contained repair directions that were implemented. No other potential leaks were found. The inspector observed the video made by the licensee with the submersible of the RWT bottom repair and was satisfied with the repair material application.

The licensee considered this repair to be an interim measure, as recognized in the above mentioned evaluation. The tank was built to the 1967 ANSI specification mentioned above, which was available prior to the later ASME Code revision which incorporated tanks of this type. FPL determined that an ASME Section XI Code repair was not practical in that the affected

tank has a TS required minimum volume during operation. A plant shutdown and cooldown with unnecessary cycling of facility systems and components would be required to perform a code repair of the tank. To document this, the licensee, after discussions with the NRC, submitted a relief request to the NRC describing the temporary repair that had been made to this Class 2 tank. The licensee was continuing with the RWT NDE examinations after the end of the inspection period and planning a final Code repair in the upcoming Unit 1 1994 outage.

(2) On July 2, the inspector observed a 1B purification ion exchanger resin discharge. The evolution was well controlled and conducted per OP 1-0520020, Rev 29, Radioactive Resin Replacement, Appendix J, Resin Transfer/Replacement for 1B Purification Ion Exchanger. Overall health physics controls were established and maintained. All radiation alarms worked as required. The inspector observed good co-ordination between staffs. Some primary water isolation valves leaked-by slightly, creating a slight delay in the evolution. Work orders to repair the leaking valves had been submitted.

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.

Operators conducted operations for each unit in a routine manner during this period. Operators demonstrated alert operation by identifying a small RWT leak.

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:

a. I&C 1-1220052, Rev 19, Linear Power Safety and Control Channel Monthly Calibration.

b. OP 2-1400050, Rev 25, Reactor Protection System - Monthly Functional Test.

c. OP 2-0700050, Rev 29, Auxiliary Feedwater Periodic Test [2C AFW pump].

During performance of this test, steam supply valve MV 08-13 did not open promptly. This is discussed in paragraph 5. Following pump and valve troubleshooting and adjustments, the inspector observed satisfactory operation.

d. GMP 1-M-0018F, Mechanical Maintenance Safety-Related Preventive Maintenance Program, Rev 18, PM 264 [Unit 1], Cable Spreading Room Halon Fire Extinguishing System Quarterly Inspection. This is discussed in paragraph 6.

The licensee satisfactorily performed these surveillance activities.

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 0904/63, Repair Unit 1 RPS Channel "D"

On July 6, while performing monthly functional surveillance of the Unit 1 RPS per I&C procedure 1-1220052, NPWO 0858/63, the "D" channel failed electrically. The technician was pulling out a "D" cabinet power supply drawer when a small spark was observed.

Simultaneously, the channel indicating lights went dark. The inspector witnessed the subsequent troubleshooting.

Investigation per the above NPWO revealed a grounded power supply wire serving a linear power drawer, which was located above the power supply drawer that was pulled out. The wire insulation was rubbed through by the edge of the pulled power supply drawer. When the power supply grounded, a supply circuit breaker opened and deenergized the entire RPS channel. The inspector observed the insulation damage and saw no degradation of conductor integrity. Permanent repair was not immediately feasible because the applicable T/M did not detail the type of wire that had been damaged. The licensee contacted the NSSS vendor for the information. The licensee temporarily taped the wire, completed the "D" RPS channel surveillance, and returned the RPS channel to service pending permanent repair.

The licensee checked the other Unit 1 RPS channels for rubbed or nicked wires. The equivalent "A" channel wire was nicked but not shorted. It was taped until a replacement wire type could be identified.

Subsequent to the inspection period, the licensee replaced the damaged wires on August 3.

b. NPWO 0913/63, Troubleshoot Ground in 1C AFW Pump Controller

An intermittent 120 Volt DC ground was traced to 1C AFW pump throttle valve, MV 08-3. The -5 volt ground, present for one day, was found when the valve was tagged out for preventive maintenance on July 6. When the valve circuit breaker was opened, the ground cleared. The ground had been too intermittent to be located by normal ground determination procedures. With the inspector observing the work, the ground was determined to be in the pump's Terry turbine driver Woodward governor speed control module.

The speed control module had been recently replaced with an upgraded part as a part of an effort to improve pump reliability. The symptoms were described to the module vendor and they confirmed the problem.

The licensee had saved the recently removed module. Within one day, this module was re-installed and the pump was satisfactorily tested, well within the applicable 72-hour LCO action time.

c. NPWO 6697/65, MV 09-10 Grease Leakage Troubleshooting

A Unit 1 AFW injection valve, MV 09-10, was observed to have lost some grease from the grease seal area around its vertically mounted actuator shaft. The actuator had been rebuilt during the recent outage and had operated for over one month without obvious grease loss. An approximate 1/8 pint of grease fell out of the actuator's

internals onto the valve body/packing area. After the grease was removed, the valve was satisfactorily stroke tested and the actuator was checked for grease level. The inspector observed the valve performance test, grease sampling activities, and general valve condition and found them satisfactory. The actuator gear box was nearly full of grease. During subsequent valve stroking, additional small volumes of grease exited the seal area.

The actuator was removed and inspected per the above NPWO. Disassembly revealed that the actuator's shaft grease seal was missing. The valve actuator disassembly process and actuator internal condition were evaluated by the inspector. Procedure MP 0940075, Rev 3, Maintenance and Repair of Limitorque Valve Actuators Type SMB-000, section 9.26, required the installation of the seal. The assembling electrician had simply missed the seal installation step. The individual was counseled about the error. The inspector considered the procedure adequate for proper seal installation. Due to the nature of the error and the licensee's prompt corrective action, this violation will not be subject to enforcement action because the licensee's efforts in identifying and correcting the violation meet the criteria specified in Section VII.B of the NRC Enforcement Policy. This is a Non-Cited Violation, NCV 50-335/93-18-01, Failure to Follow a Motor Operated Valve Maintenance Procedure.

d. NPWOs 2779/69 and 2780/69, Perform Preventive Lubrication of Mechanical Fire Pump Coupling and Fire Pump Bearing, respectively.

This is discussed in section 6 below.

e. NPWO 6765/66, MV 08-13 Troubleshooting

The steam driven 2C AFW pump was taken out of service for preventive maintenance on its Woodward hydraulic governor. At the conclusion of the maintenance, the pump was started four times to clear air from the governor lines. Post-maintenance surveillance was scheduled prior to its return to service. The inspector observed the surveillance test.

During the 2C AFW pump surveillance, a redundant steam supply valve was slow to stroke. The above NPWO was issued for the administrative control of the troubleshooting and repair. During the pump start sequence, the MOV stalled for greater than ten seconds and then opened. The surveillance was stopped to investigate.

Electrical maintenance evaluated the valve under available testing methods [primarily VOTES]. Engineering was involved the in the process even prior to the issuance of NCR 2-536. Investigation and valve actuator testing revealed the actuator torque switch was set at the high end of its torque switch window. Insulation resistance readings on the actuator motor indicated no problems. The

inspectors were present during this testing. During trouble shooting under normal steam differential pressure the initial pullout [thrust] force exceeded the normal operational limits for the MOV's SMB 000 actuator. As seen below, the applied force was not sufficient to damage the actuator or valve. Well within the LCO time limit for the subsystem, additional testing after the torque switch had been adjusted was performed on MV 08-13 and testing was also performed on the MV 08-12, the redundant steam admission valve for the pump.

Subsequent testing observed by the inspector indicated that the pullout forces were far less than those initially experienced, but were close to the normal maximum limit for the type of actuator. The licensee postulated that the MV 08-13 gate assembly had developed surface irregularities and that the series of test operations had worn off these irregularities. Both the licensee and the inspector had seen similar occurrences in the past. Based on the satisfactory testing and preliminary discussions with both the valve and actuator vendor, the NCR [2-536 of July 21] was answered permitting continued operation of the valve with limited cycles of the valve permitted at the high end of its normal operation thrust limit. The 2C AFW pump was surveilled satisfactory prior to exceeding the LCO action statement time limit. The NCR indicated a subsequent engineering evaluation would follow.

Engineering evaluation JPN-PSL-SEMP-93-038, Rev 0 [July 29], supported the NCR conclusions and provided corrective actions. The evaluations supported valve operation at the higher thrust initially experienced. Additionally, the valve vendor provided supporting information regarding valve loading at these higher values. The recommended actions, mimicking those of the NCR, were:

(1) place the AFW 2C pump in operation prior to declaring either the 2A or 2B AFW pumps out of service;

(2) increase the surveillance frequency for MV 08-13 to every thirty days [in lieu of every 60 days]; and,

(3) limit the number of cycles of operation [50 cycles at the high force initially seen when the problem was found].

(4) Long term recommendations of the evaluation directed that valve disassembly be pursued and that engineering consider and develop design improvements. The valve was needed to open once on signal for subsystem operation.

The inspector agreed with the above recommended actions.

f. NPWO 6775/66, MV 08-12 VOTES Testing

This testing, performed in conjunction with the above MOV issue, indicated that this valve/actuator combination did not have similar problems to MV 08-13.

g. NPWO 7900/61, Support RWT Work and Inspection

This NPWO was the administrative vehicle for mechanical maintenance to support the RWT tank inspections. This included scaffold setup, crane support, and tank manway removal. These activities were performed in a satisfactory manner.

Maintenance was generally well controlled and well performed. Maintenance was performed in a timely manner to support plant operations.

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 of hazardous chemicals, ignition source/fire risk reduction efforts, fire protection system surveillance activities, and fire barriers.

The inspectors observed preventive maintenance on the 1A fire pump per the NPWO described in section 5.d. The preventive maintenance was performed in accordance with procedure 1-M-0018F, Rev 18, Fire PMs. The fire protection technician was present with the maintenance mechanic during the activity. The lubrication process was well controlled.

After the above maintenance, with the inspector present, operations personnel performed a fifteen minute pump run, and observed that bearing temperature rise, audible noise level, and discharge pressure were acceptable. Since the pump was not in the ASME Code Section XI pump and valve program, the test procedure did not take vibration or bearing temperature data. Acceptability for these parameters was left to the non-licensed operator's judgement and that of the inspector.

As indicated in paragraph 4.d, the inspector observed a Unit 1 cable spreading room Halon system surveillance. A vendor and two FPL fire protection technicians were the test cadre. A fire watch was posted while the system was out of service during the surveillance. The system tests met all acceptance criteria. System feature checks included, but were not limited to, the following:

- fusible link inspection in area ventilation openings between trains;
- weighing of Halon bottles;
- flow tests of Halon bottle actuation valves;
- weight of the nitrogen initiation bottle;
- pull test of the manual actuation switches; and
- alarm and warning light response under actuation conditions.

Fire protection activities were well coordinated and effectively accomplished.

7. Bulletin 93-02 Closeout

The NRC recently issued Bulletin 93-02, Debris Plugging of Emergency Core Cooling Suction Strainers. This Bulletin addressed fibrous material not designed to withstand a LOCA being left in containment during operation. Recent events of clogged ECCS suction strainers had occurred at other sites. The bulletin asked licenses to identify and take compensatory measures for fibrous air filters or other temporary sources of fibrous material, not designed to withstand a LOCA and installed or stored in the primary containment. The inspector reviewed both the licensee's program for ensuring that such material was controlled and the licensee's actions responding to the Bulletin. The program is contained in AP 0010728, Rev 10, Post Outage Review. Procedure Appendix B addresses a number of material condition items, including removal of temporary filter media from fan coolers. Management signatures are required. OP 1-0030120, Rev 52, and 2-0030120, Rev 46, Prestart Check-off List, both require QC verification that the applicable portion of AP 0010728 is complete prior to heating the affected unit above 200 degrees F. The licensee documented specific inspections of Units 1 and 2 in QC Reports M93-1020 of May 23, 1993, and M93-991 of May 21, 1993. No subject material was found. The inspectors have routinely inspected containment buildings prior to heatup for several years, including this Spring. This material has not been found for a number of years. The licensee responded to the Bulletin in letter L-93-145 dated June 1, 1993, stating that subject material has not been found. An NRC letter of July 13, 1993, acknowledged the response. This item is closed.

8. Exit Interview

The inspection scope and findings were summarized on August 20, 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
335/93-18-01	open	NCV -	Failure to Follow Motor Operated Valve Maintenance Procedure, paragraph 5.c.

9. Abbreviations, Acronyms, and Initialisms

AFW	Auxiliary Feedwater (system)
ANSI	American National Standards Institute
DEH	Digital Electro-Hydraulic (turbine control system)
ECCS	Emergency Core Cooling System
EDG	Emergency Diesel Generator
ESF	Engineered Safety Feature

FPL	The Florida Power & Light Company
GMP	General Maintenance Procedure
gpm	Gallon(s) Per Minute (flow rate)
JPN	(Juno Beach) Nuclear Engineering
LCO	TS Limiting Condition for Operation
MOV	Motor Operated Valve
MV	Motorized Valve
NCR	Non Conformance Report
NCV	NonCited Violation (of NRC requirements)
NPWO	Nuclear Plant Work Order
NRC	Nuclear Regulatory Commission
OP	Operating Procedure
PM	Preventive Maintenance
PSL	Plant St. Lucie
RAB	Reactor Auxiliary Building
Rev	Revision
RII	Region II - Atlanta, Georgia (NRC)
RPS	Reactor Protection System
RWT	Refueling Water Tank
SMB	Type of valve actuator
St.	Saint
T/M	Technical Manual
TS	Technical Specification(s)
VOTES	Valve Operation Test & Evaluation System