



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

Report Nos.: 50-335/85-20 and 50-389/85-20

Licensee: Florida Power and Light Company  
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: July 9 - August 12, 1985

Inspection at St. Lucie site, near Ft. Pierce, Florida

Inspectors: S. Guenther  
R. V. Crlenjak, Senior Resident Inspector

Sept 3, 1985  
Date Signed

S. Guenther  
H. E. Bibb, Resident Inspector

Sept 3, 1985  
Date Signed

Approved by: S. A. Elrod  
S. A. Elrod, Section Chief  
Division of Reactor Projects

Sept 4, 1985  
Date Signed

SUMMARY

Scope: This routine, unannounced inspection involved 218 inspector-hours onsite in the areas of Technical Specification (TS) compliance, operator performance, overall plant operations, Quality Assurance (QA) practices, station and corporate management practices, corrective and preventive maintenance activities, site security procedures, radiation control activities, surveillance activities and reactor trips.

Results: Of the areas inspected, one violation was identified (paragraph 11).

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## REPORT DETAILS

### 1. Persons Contacted

#### Licensee Employees

- \*K. N. Harris, St. Lucie Vice President
- \*D. A. Sager, Plant Manager
- J. H. Barrow, Operations Superintendent
- T. A. Dillard, Maintenance Superintendent
- \*L. W. Pearce, Operations Supervisor
- R. J. Frechette, Chemistry Supervisor
- C. F. Leppla, Instrument and Control (I&C) Supervisor
- P. L. Fincher, Training Supervisor
- \*C. A. Pell, Technical Staff Supervisor (Acting)
- E. J. Wunderlich, Reactor Engineering Supervisor (Acting)
- H. F. Buchanan, Health Physics (HP) Supervisor
- J. G. West, Security Supervisor
- J. Barrow, Fire Prevention Coordinator
- J. Scarola, Assistant Plant Superintendent - Electrical
- G. Wilson, Assistant Plant Superintendent - Mechanical
- N. G. Roos, Quality Control (QC) Supervisor

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

\*Attended exit interview

### 2. Exit Interview

The inspection scope and findings were summarized on August 15, 1985, with those persons indicated in paragraph 1. The licensee did not identify as proprietary any of the materials provided to or reviewed by the inspectors during this inspection.

### 3. Licensee Action on Previous Inspection Findings

(Closed - Unit 1) Unresolved Item 50-335/84-25-01, Routing and Tracking IE Notices.

The inspector reviewed the licensee's operating experience feedback program and determined it to be satisfactory at this time.

(Closed - Unit 1) Violation 50-335/84-29-01, Failure to wear Protective Clothing Required by RWP.

The inspector has continued to observe the use of protective clothing in various radiation controlled areas and found present practices to be satisfactory.

#### 4. Unresolved Items

Unresolved items were not identified during this inspection.

#### 5. Plant Tours (Units 1 and 2)

The inspectors conducted plant tours periodically during the inspection period 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, that critical clean areas were being controlled in accordance with procedures, that excess equipment or material was stored properly and that combustible material 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 inspectors routinely conducted partial walkdowns of emergency core cooling systems. Valve, breaker/switch lineups and equipment conditions were randomly verified both locally and in the control room. During the inspection period, the inspectors conducted a complete walkdown in the accessible areas of the Unit 2 auxiliary feedwater (AFW) system to verify that the lineups were in accordance with licensee requirements for operability and that equipment material conditions were satisfactory.

#### 6. Plant Operations Review (Units 1 and 2)

During the inspection period, 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. Operator performance and actions were observed and evaluated. The inspectors conducted random off-hours inspections during the reporting interval to assure that operations and security remained at an acceptable level. Shift turnovers were observed to verify that they were conducted in accordance with approved licensee procedures.

#### 7. Technical Specification Compliance (Units 1 and 2)

During this reporting interval, the inspectors verified compliance with selected limiting conditions for operation (LCO) and results of selected surveillance tests. These verifications were accomplished by direct observation of monitoring instrumentation, valve positions, switch positions, and review of completed logs and records. The licensee's compliance with selected LCO action statements were reviewed on selected occurrences as they happened.

## 8. Maintenance Observation

Station maintenance activities of selected safety-related systems and components were observed, reviewed or both 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 testing and/or calibrations were performed prior to returning components or systems to service; QC records were maintained; activities were accomplished by qualified personnel; parts and materials used were properly certified; and radiological controls were implemented as required. Work requests were reviewed to determine status of outstanding jobs and to assure that priority is assigned to safety-related equipment.

## 9. Physical Protection (Units 1 and 2)

The inspectors verified by observation and interviews during the reporting interval that measures taken to assure the physical protection of the facility met current requirements. Areas inspected included the organization of the security force, the establishment and maintenance of gates, doors, and isolation zones in the proper conditions, and verification that access control and badging were proper and that procedures were followed.

## 10. Surveillance Observations

During the inspection period, the inspectors verified that plant operations were in compliance with selected TS requirements. Typical of these were confirmation of compliance with the TS for reactor coolant chemistry, refueling water tank, containment pressure, control room ventilation and AC and DC electrical sources. The inspectors verified: that testing was performed in accordance with adequate procedures, that test instrumentation was calibrated, that LCOs were met, that removal and restoration of the affected components were accomplished, that 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 inspector observed the performance on Unit 1 of I&C procedure 1-1400050, Revision 28, Reactor Protection System Monthly Functional Test.

## 11. Reactor Trips (Unit 2)

- a. On July 18, 1985, the St. Lucie Unit 2 reactor was operating at normal full power with all systems functional. At approximately 1:00 p.m., a "DC Ground Alarm" was received in the Unit 2 control room. The Assistant Nuclear Plant Supervisor (ANPS) was notified by the operators and began execution of the DC ground isolation procedure. The ground was soon determined to be on the B safety-related DC bus. In an effort to further isolate the ground, the ANPS followed the procedure instructions, sequentially removing and replacing fuses in various

B DC bus loads. When the ANPS removed the fuses to the B main steam isolation valve (MSIV) air supply solenoid valves, the reactor tripped on asymmetric steam generator (SG) pressure. The operators observed that the A MSIV closed, and upon reactor trip carried out the immediate operator actions of the reactor trip - turbine trip procedure. The operators ensured that AFW was supplied to both SGs and, as opposed to reopening the A MSIV, took manual control of the A steam header atmospheric dump valves and verified all main steam safety valves (MSSV) reseated. The unit was stabilized in hot standby without further incident.

The cause of the event was an error in Operating Procedure (OP) 2-0960030, Revision 4, DC Ground Isolation, which was being executed by the operators at the time of the event. The procedure had originally been implemented on Unit 1 and had been updated to reflect a plant change/modification (PC/M) which changed the MSIV closure logic circuit. When Unit 2 became operational, the same procedure was implemented on Unit 2 without proper verification of the plant's configuration to validate the procedure. The PC/M had never been implemented on Unit 2, so the procedure did not accurately reflect the as-built operation of the MSIV closure logic circuit. The error has been present in the procedure since its initial issue for Unit 2 but went undiscovered because, in each previous use of the procedure, the ground fault was isolated before the B MSIV fuses were pulled.

An additional discrepancy discovered during investigation of this incident was a jumper found installed in the reactor/turbine gage board (RTGB) which connected the positive legs of the MSIV control power and test circuits to the MSIV. A PC/M had been implemented to separate these two circuits (PC/M 145-283), but this jumper did not appear on the original RTGB wiring diagrams; therefore, it was missed in the process of separating the circuits. This jumper did not degrade the system's normal operation, but created some confusion when a fuse was removed and power remained on the MSIV. The jumper was removed through proper procedures.

TS 6.8.1 requires that written procedures be established, implemented and maintained concerning activities recommended in Appendix A of USNRC Regulatory Guide (RG) 1.33, Revision 2, February 1978. Section 6 of Appendix A of RG 1.33 states that a loss of electrical power/degraded power source is an event/activity which should be covered by a written procedure.

Contrary to the above, OP 2-0960030, DC Ground Isolation, was not adequately established and maintained to reflect the operating characteristics of the Unit 2 MSIV air supply solenoid valve logic control circuit.

This failure to comply with TS 6.8.1 constitutes violation 50-389/85-20-01.

- b. On August 8, 1985, the St. Lucie Unit 2 reactor was operating at normal full power with all systems functional. At approximately 2:02 a.m., a fuse blew in the A train electrical supply to the SA engineered safeguards actuation cabinet relays.

This initiated an A train containment isolation actuation signal (CIAS), a MSIS and a safety injection actuation signal (SIAS) which auto-started the A train high pressure safety injection (HPSI) pump, low pressure safety injection (LPSI) pump and the emergency diesel generator (EDG). The MSIS closed the A and B MSIVs.

The reactor protection system initiated a reactor trip on low steam generator water level with subsequent turbine trip, electric generator trip and station power transfer to the start-up transformers. Several MSSVs opened and a power operated relief valve (PORV) actuated for about one second. The A, B, and C AFW pumps started giving full auxiliary feed to the SGs. Subsequently, the operator opened the atmospheric steam dumps to reseal the MSSV.

The CIAS signal caused isolation of the component cooling water (CCW) to the 2A1 and 2B2 reactor coolant pumps (RCP). The reactor operator then secured RCPs 2A1 and 2B2.

A B channel SIAS actuated about 2:09 a.m. due to low reactor coolant system (RCS) pressure caused by the excessive RCS cooldown. The operator left RCPs 2A2 and 2B1 running. The B train HPSI, LPSI and EDG auto-started.

By 2:15 a.m. the MSSVs had reseated; the cooldown was stopped; and RCS pressure was returning to normal. At 2:18 a.m. the operators secured RCPs 2A2 and 2B1 due to approaching ten minutes with no CCW cooling. At 2:23 a.m. SIAS channel B reset as RCS pressure recovered. At 2:30 a.m. CCW flow was re-established to RCPs 2A2 and 2B1. Natural circulation cooldown was verified. RCS pressure and temperature were stabilized at 2200 psig and 530 degrees respectively.

At 2:41 a.m. the B train HPSI, LPSI and EDG were secured. At 2:42 a.m. there were two brief PORV actuations due to high RCS pressure. Valve reseating was confirmed.

At 3:28 a.m. the A train HPSI and LPSI were secured.

At 5:50 a.m. the blown fuse in the channel A engineered safety features actuation system power supply was replaced; SIAS channel A was reset; the A train EDG was secured; and the A train HPSI and LPSI were returned to the automatic mode. CCW was restored to the RCPs with 2A2 and 2B1 being started to begin forced cooldown. The RCP seals were damaged due to the CCW interruption, and all four pumps' seals are being replaced during the short outage.