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

Report No.: 50-302/85-44

Licensee: Florida Power Corporation
3201 34th Street, South
St. Petersburg, FL 33733

Docket No.: 50-302 License No.: DPR-72

Facility Name: Crystal River 3

Inspection Conducted: November 26, 1985 - January 17, 1986

Inspector: S. Gwenthen for 2/11/86
T. F. Stetka, Senior Resident Inspector Date Signed

Accompanying Personnel: J. E. Tedrow, Resident Inspector

Approved by: Elrod 2/11/86
S. A. Elrod, Section Chief Date Signed
Division of Reactor Projects

SUMMARY

Scope: This routine inspection involved 266 inspector-hours on site by two resident inspectors in the areas of plant operations, security, radiological controls, Licensee Event Reports and Nonconforming Operations Reports, and licensee action on previous inspection items. Numerous facility tours were conducted and facility operations observed. Some of these tours and observations were conducted on backshifts.

Results: Two violations and one deviation were identified: Failure to make a one hour report to the NRC Operations Center as required by 10 CFR 50.72, paragraph 6.b; Failure to adhere to the requirements of a Radiation Work Permit, paragraph 5.b(5); Deviation from a commitment to an NRC violation, paragraph 5.a.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*W. Bandhauer, Manager, Special Projects
*P. Breedlove, Nuclear Records Management Supervisor
C. Brown, Assistant Outage and Modifications Manager
J. Bufe, Nuclear Compliance Specialist
*R. Clarke, Radiation Protection Manager
*D. Eggleston, Nuclear Shift Supervisor
*V. Hernandez, Senior Nuclear Quality Assurance Specialist
B. Hickle, Nuclear Plant Operations Manager
E. Howard, Director, Site Nuclear Operations
K. Lancaster, Manager, Site Nuclear Quality Assurance
J. Lander, Nuclear Outage and Modifications Manager
P. McKee, Nuclear Plant Manager
G. Moore, Chairman, Nuclear General Review Committee
*J. Roberts, Nuclear Chemistry Manager
V. Roppel, Nuclear Plant Engineering and Technical Service Manager
P. Skramstad, Nuclear Chemistry/Radiation Protection Superintendent
*D. Smith, Nuclear Maintenance Superintendent
*R. Thompson, Nuclear Engineering
*K. Wilson, Supervisor, Site Nuclear Licensing
R. Wittman, Nuclear Operations Superintendent

Other licensee employees contacted included office, operations, engineering, maintenance, chemistry/radiation, and corporate personnel.

*Attended exit interview

2. Exit Interview

The inspector met with licensee representatives (denoted in paragraph 1) at the conclusion of the inspection on January 17, 1986. During this meeting, the inspector summarized the inspection scope and findings with particular emphasis on the violations, deviation, unresolved item (UNR), and inspector followup items (IFIs).

The licensee representatives acknowledged the inspector's comments and 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 Items

(Open) IFI 302/85-37-03: On January 15, 1986, the "A" Emergency Diesel Generator (EDG-3A) failed to start on the first attempt during routine performance of a surveillance test. Inspection of the diesel by plant personnel failed to determine a cause for the start failure and the diesel subsequently started satisfactorily on a second attempt. The licensee is presently investigating the cause for the diesel start failure. The inspector will track this item along with the evaluation of the excessive start times for EDG-3A.

(Closed) IFI 302/85-33-02: The licensee has revised the feedwater system drawing FD-302-081 and has deleted valve FWV-159. The inspector has reviewed the drawing revision and considers this item closed.

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. A new unresolved item is identified in paragraph 6.b(1) of this report.

5. Review of Plant Operations

The plant started this inspection period in power operation (Mode 1). On December 3, 1985, at 8:55 a.m., the reactor tripped due to the loss of power to two reactor coolant pumps (RCPs) which caused an anticipatory reactor trip (See paragraph 8.a for details of this event). Repairs were completed and power was restored to the RCPs on December 9, 1985. The reactor was taken critical at 3:00 a.m. on December 10; Mode 1 Operations were resumed at 3:47 a.m.

On January 1, 1986, at 11:34 p.m., a reactor trip occurred due to a power to flow mismatch caused by a severed shaft on RCP-1A. The plant was cooled down to a cold shutdown condition (Mode 5) at 1:00 p.m. on January 4, 1986 to investigate and effect repairs to the RCP (See paragraph 8.b for details of this event). The plant remained in Mode 5 for the remainder of this reporting period.

a. Shift Logs and Facility Records

The inspector reviewed plant operating records and discussed various entries with operations personnel to verify compliance with the Technical Specifications (TSs) and the licensee's administrative procedures.

The following records were reviewed:

Shift Supervisor's Log; Reactor Operator's Log; Equipment Out-Of-Service Log; Shift Relief Checklist; Auxiliary Building Operator's Log; Active Clearance Log; Daily Operating Surveillance Log; Work Request Log; Short Term Instructions (STIs); and selected Chemistry/Radiation Protection Logs.

In addition to these record reviews, the inspector independently verified clearance order tagouts.

On January 5, 1986, the inspector noted an entry in the Shift Supervisor's Log which stated that the concentration of gas in the "A" Waste Gas Decay Tank (WGDT-1A) was 4.4% oxygen and 22% hydrogen and that action statement (b) of TS 3.7.13.5 had been entered. This TS requires that the addition of waste gas to the affected tank be immediately suspended and that the oxygen concentration in the tank be reduced without delay whenever the concentration of oxygen and hydrogen is greater than or equal to 4%. The inspector discussed this matter with the Shift Supervisor to determine what actions were being taken by plant personnel. The inspector was informed that WGDT-1A had been isolated and that a radioactive gaseous release permit was being generated to release the contents of the tank and thereby lower the oxygen concentration in the tank. The inspector inquired if any nitrogen had been added to the tank to reduce the oxygen concentration. The inspector was informed that no means existed for plant personnel to add nitrogen to the tank, but that a work request was being prepared to connect a nitrogen addition source to an instrument line to supply nitrogen to the affected tank.

A similar event occurred on December 14, 1984, in which the concentration of gas in the WGDTs exceeded the 4% hydrogen and oxygen limits. In that case, the licensee attempted to reduce the oxygen concentration in the tanks by adding nitrogen via the waste gas header. The NRC issued a violation (302/84-33-01) for failure to secure waste gas additions to the WGDTs as required by TS 3.7.13.5.b.

In their response letter dated June 6, 1985, the licensee stated that a temporary nitrogen source would be connected to an instrument tap of the affected WGDT for the direct addition of nitrogen to the tank. This letter further stated that this action would be completed by June 20, 1985.

The failure to establish and maintain the corrective actions as described in a response to an NRC violation is considered to be a deviation from a commitment to the NRC.

This will be tracked as Deviation 302/86-44-01: Failure to establish and maintain corrective actions as described in the response to an NRC violation.

b. Facility Tours and Observations

Throughout the inspection period, facility tours were conducted to observe operations and maintenance activity in progress. Some operations and maintenance activity observations were conducted during backshifts. Also, during this inspection period, the inspector attended licensee meetings to observe planning and management activities.

The facility tours and observations encompassed the following areas: security perimeter fence; control room; emergency diesel generator room; auxiliary building; intermediate building; battery rooms; and electrical switchgear rooms.

During these tours, the following observations were made:

(1) Monitoring Instrumentation - The following parameters were observed to verify conformance with the TS for the current operational mode:

Equipment operating status; area atmospheric and liquid radiation monitors; electrical system lineup; reactor operating parameters; and auxiliary equipment operating parameters.

While observing operations on December 16, the inspector noted the indications for the control valves that operate the turbine-driven emergency feedwater pump (EFP-2). These control valves, designated ASV-5 and ASV-204, only have one set of indications to show the position (i.e., open, intermediate, and closed) of two valves installed in parallel. This indication setup caused operator confusion during a plant trip that occurred on November 22 because they did not realize that one of the valves had not gone completely shut when an attempt was made to secure the pump.

The inspector reviewed system electrical drawings and determined that the valve position indication (VPI) circuitry did not permit positive indication of valve positions.

These observations and findings were discussed with licensee representatives. The licensee acknowledged the inspector's findings and has issued a field problem report (FPR #86-00001) to initiate the design change process. The licensee's intent is to add a second set of VPI lights for these valves to the main control board.

This will be tracked as IFI 302/85-44-02: Review the licensee's progress to install a second set of VPI lights for valves ASV-5 and ASV-204.

(2) Safety Systems Walkdown - The inspector conducted a walkdown of the reactor building spray system to verify that the lineup was in accordance with licensee requirements for system operability and that the system drawing and procedure correctly reflect "as-built" plant conditions.

No violations or deviations were identified.

(3) Shift Staffing - The inspector verified that operating shift staffing was in accordance with TS requirements and that control room operations were being conducted in an orderly and professional manner. In addition, the inspector observed shift turnovers on various occasions to verify the continuity of plant status, operational problems, and other pertinent plant information during these turnovers.

No violations or deviations were identified.

(4) Plant Housekeeping Conditions - Storage of material and components and cleanliness conditions of various areas throughout the facility were observed to determine whether safety and/or fire hazards existed.

No violations or deviations were identified.

(5) Radiation Areas - Radiation control areas (RCAs) were observed to verify proper identification and implementation. These observations inc'uded selected licensee conducted surveys, review of step-off pad conditions, disposal of contaminated clothing, and area posting. Area postings were independently verified for accuracy through the use of the NRC's radiation monitoring instrument. The inspector also reviewed selected radiation work permits and observed the use of protective clothing, respirators, and personnel monitoring devices to assure that the licensee's radiation monitoring policies were being followed.

On December 30, 1985, the inspector observed an individual that was not wearing a protective hood covering on his head or rubber shoes on his feet while working inside a contaminated area in the hot machine shop. The inspector contacted a health physics technician monitoring this work and reviewed the radiation work permit established for this job (RWP-1068) and determined that a hood and rubber shoes were required to be worn inside the contaminated area. When the health physics technician was made aware of the inspector's observation, he corrected the problem by instructing the individual to don the required protective clothing.

Chemistry and Radiation Protection Procedure RSP-101, Basic Radiological Safety Information and Instructions for "Radiation Workers", step 3.1.3.4 directs that the requirements established on RWPs be observed. Failure to meet the requirements of procedure RSP-101 is contrary to the requirements of TS 6.8.1.a and is considered to be a violation. This appears to be a recurrent and uncorrected violation since a similar violation was identified in NRC Inspection Report 50-302/85-41 on October 7, 1985.

This item will be tracked as Violation 302/85-44-03: Failure to adhere to the requirement of procedure RSP-101 to wear protective clothing established on an RWP.

(6) Security Control - Security controls were observed to verify that security barriers were intact, guard forces were on duty, and access to the protected area (PA) was controlled in accordance with the facility's security plan. Personnel within the PA were observed to verify that badges were properly displayed and that personnel were properly escorted, as required. Personnel within vital areas were observed to ensure proper authorization for the area.

On December 19, the inspector was notified of a breach in one of the plant's vital area barriers. The inspector toured the affected area with plant security personnel to observe the barrier. This event was subsequently inspected by NRC Region II security personnel as detailed in NRC Inspection Report 50-302/86-02. Further information concerning this event is discussed in that report.

(7) Fire Protection - Fire protection activities, staffing and equipment were observed to verify that fire brigade staffing was appropriate and that fire alarms, extinguishing equipment, actuating controls, fire fighting equipment, emergency equipment, and fire barriers were operable.

No violations or deviations were identified.

(8) Surveillance - Surveillance tests were observed to verify that approved procedures were being used; qualified personnel were conducting the tests; tests were adequate to verify equipment operability; calibrated test equipment was utilized; and TS requirements were followed.

The following tests were observed and/or data reviewed:

- SP-122, T-Stat Meter Calibration;
- SP-170, Pressurizer Level Instrumentation Calibration;
- SP-317, RC System Water Inventory Balance;
- SP-335, Radiation Monitoring Instrumentation Functional Test;
- SP-344, Nuclear Services Cooling System Operability;
- SP-349, Emergency Feedwater System Operability Demonstration;
- SP-421, Reactivity Balance Calculations; and
- SP-422, RC System Heatup and Cooldown Surveillance.

No violations or deviations were identified.

(9) Maintenance Activities - The inspector observed maintenance activities to verify that correct equipment clearances were in effect; work requests and fire prevention work permits, as required, were issued and being followed; quality control personnel were available for inspection activities as required; and TS requirements were being followed.

Maintenance was observed and work packages were reviewed for the following maintenance activities:

- Rebuilding of a steam generator code safety relief valve (MSV-41) in accordance with maintenance procedure MP-109;

- Removal and reinstallation of a pressurizer code safety relief valve (RCV-8) in accordance with procedure MP-102;

- Bearing replacement on the "B" nuclear services closed cycle cooling pump (SWP-1B) in accordance with procedure MP-123;

- Replacement of oil level sightglasses on the turbine-driven emergency feedwater pump (EFP-2) in accordance with procedure MP-162;

- Motor operated valve analysis and testing (MOVATS) on emergency feedwater valve EFW-32; and

- Replacement of blown fuses on a vital bus inverter.

No violations or deviations were identified.

(10) Radioactive Waste Controls - Solid waste compacting and selected liquid and gaseous waste releases were observed to verify that approved procedures were utilized, that appropriate release approvals were obtained, and that required surveys were taken.

No violations or deviations were identified.

(11) Pipe Hangers and Seismic Restraints - Several pipe hangers and seismic restraints (snubbers) on safety-related systems were checked to insure that fluid levels were adequate and no leakage was evident, that restraint settings were appropriate, and that anchoring points were not binding.

On December 18, while touring the intermediate building (IB), the inspector noted that snubbers MSH-117 and MSH-119 had loose jam nuts thereby allowing the snubbers to twist in their mountings. Such twisting would allow a snubber's fluid reservoir to drain. It was also noted that snubber MSH-119 had a low fluid level.

Following notification of the inspector's findings, the licensee corrected these discrepancies. Based on further discussions between the licensee and the inspector and consistent with the plant's present shutdown condition, the licensee agreed to perform a 100% visual inspection of safety-related snubbers to determine if other discrepancies exist. The licensee will revise the visual inspection procedure, SP-201, prior to these inspections to ensure that the jam nuts are verified to be secure.

Corrective action for this finding will be tracked as IFI 302/85-44-04: Review the revision to SP-201 to verify inclusion of the jam nut verification and review the completed inspection data.

6. Review of Licensee Event Reports and Nonconforming Operations Reports

a. Licensee Event Reports (LERs) were reviewed for potential generic impact, to detect trends, and to determine whether corrective actions appeared appropriate. Events, which were reported immediately, were reviewed as they occurred to determine if the TSs were satisfied.

LERs 85-23 through 85-32 were reviewed in accordance with current NRC policy. LERs 85-24, 85-25, 85-28, 85-29, and 85-31 are closed. LERs 85-23, 85-26, 85-27, 85-30, and 85-32 remain open for the following reasons:

(1) LER 85-23 reported a plant trip that was caused by the failure of a vital bus inverter. The licensee's investigation indicated that the inverter failure was caused by the malfunction of a static transfer switch. The licensee is presently reviewing the design of these transfer switches and plans on making design changes as necessary. This LER remains open pending the completion of the design changes to these transfer switches.

(2) LER 85-26 reported the plant trip event of November 22 caused by problems with the plant's feedwater system. As a result of this event, the licensee has initiated several corrective actions including a review of the main feedwater transfer methods during plant shutdown, additional operator training on the emergency

feedwater initiation and control (EFIC) system, and a detailed study of the power operated relief valve (PORV) relay failure. This LER remains open pending completion of these corrective actions.

(3) LER 85-27 reported a spurious actuation of the EFIC system and the failure of operations personnel to enter a TS action statement for an emergency feedwater pump. This LER remains open pending a revision to the plant cooldown procedure (OP-209) to ensure that the appropriate TS action statement for the turbine-driven emergency feedwater pump is entered when required.

(4) LER 85-30 reported a challenge to the reactor protection system (RPS) for the reactor coolant pump power monitor (RCPPM) system while the plant was in hot standby (Mode 3). To prevent recurrence of this event, the licensee is making a change to procedure OP-302 to ensure the RCPPMs are bypassed prior to transferring pumps. This LER remains open pending completion of this procedure change.

(5) LER 85-32 reported the discovery of a design error that involved the 230 kilovolt (KV) switchyard. The licensee has corrected the error and is reviewing all other design changes that involve interface with the fossil power plants to ensure that no other design errors exist. This LER remains open pending completion of this review.

b. The inspector reviewed Nonconforming Operations Reports (NCORs) to verify the following: compliance with the TS, corrective actions as identified in the reports or during subsequent reviews have been accomplished or are being pursued for completion, generic items are identified and reported as required by 10 CFR Part 21, and items are reported as required by the TS.

All NCORs were reviewed in accordance with current NRC policy.

As a result of these reviews, the following items were identified:

(1) NCOR 85-235, dated November 22, 1985, reported an error made by a Quality Control (QC) inspector during the performance of a hydrostatic test on a makeup pump (MUP). The error involved a failure by the QC inspector to verify proper water purity as required by the procedure.

Another NCOR, 85-258, dated December 30, 1985, reported the failure of a QC inspector to completely inspect a snubber as required by the procedure. This failure was discovered when problems with the snubber led to a review of the snubber maintenance records.

On June 20, 1985, the inspector's record review of a modification being performed in the field, identified that an inadequate QC inspection resulted in improper anchor bolt torquing. As a result of this finding, a violation was issued as described in NRC Inspection Report 50-302/85-26. The licensee's response to this violation included, in part, the retraining of all inspectors involved with the installation of the anchor bolts.

The events of November 22 and December 30, when viewed in light of the June 30 violation, indicate a possible weakness in the qualifications of site QC inspectors.

Additionally, the resident inspectors have observed the licensee's practice of switching personnel into different jobs to provide career enhancement. This has resulted in maintenance personnel being transferred to the QC department and QC inspectors being transferred to the maintenance department. The inspectors have questioned the qualifications of personnel in these new positions.

The licensee has been notified of the concerns relating to QC inspector qualifications and is reviewing these issues to determine if corrective actions are necessary.

This issue will be tracked as UNR 302/85-44-05: Provide justification that QC inspector and supervisor qualifications are adequate.

(2) NCOR 85-249 reported an unsatisfactory condition in the 230 KV switchyard protection circuits. The existing 125 volt DC power supplies for primary and backup relaying protection disagreed with the design description presented in Section 8.2.3.3 of the Final Safety Analysis Report (FSAR) which requires two independent sources of control power. Upon reviewing this NCOR and discussing the matter with licensee representatives, the inspector determined that the one hour report to the NRC Operations Center via the Emergency Notification System was not made. Failure to report a condition outside the design basis of the plant to the NRC Operations Center is contrary to the requirements of 10 CFR Part 50.72 and is considered to be a violation (302/85-44-06): Failure to report a condition that is outside the design basis of the plant required by 10 CFR 50.72.

7. Review of IE Information Notice (IN 85-94)

The inspector reviewed the licensee's activities with respect to IN 85-94, Potential Loss of Minimum Flow Paths Leading to Emergency Core Cooling System (ECCS) Pump Damage During a Loss of Coolant Accident (LOCA). As a result of this review, it was determined that the licensee assigned responsibility for this IN to appropriate engineering personnel for study and appropriate action recommendations; this study was to be completed by March 1986.

Because of the high potential for ECCS pump damage, the inspector requested the licensee to expedite completion of this study prior to the March due date. Licensee representatives acknowledged the inspector's request and committed to have the study completed prior to plant startup from the present outage.

Resolution of this issue will be tracked as IFI 302/85-44-07: Review the licensee's actions with respect to IN 85-94.

8. Nonroutine Event Followup

a. At 8:55 a.m. on December 3, 1985, a fault occurred on the "B" 6900 volt unit auxiliary bus. The unit was operating at approximately 93% of full power. The fault caused a power surge which opened the feeder breakers to the bus. The loss of this bus deenergized two reactor coolant pumps (RCP-1B, RCP-1D) which caused a RCPPMs trip and a subsequent anticipatory reactor trip. The licensee inspected the damage which occurred to the 6900 volt switchgear and determined that a loose wire termination in the RCP-1D breaker created a phase to phase fault. Other connections inspected were also found to be loose. Both the "A" and "B" 6900 volt switchgear connections were retorqued and the protective relays were functionally tested and found to be satisfactory.

The inspectors reviewed the licensee's post-trip evaluation and corrective actions and have no further questions on this event.

b. At 11:34 p.m. on January 1, 1986, a reactor trip occurred from approximately 92% of full power due to a reactor power to reactor coolant flow mismatch. The initiating event for this reactor trip was the shearing of the pump shaft on RCP-1A. This resulted in a low flow condition in the 1A reactor coolant loop which caused the reactor coolant system flow to decrease below the established setpoint for this power level and a subsequent trip by the reactor protection system. The operators manually secured RCP-1A when a low current condition was noticed. A steam generator code safety relief valve, MSV-41, failed partially open after the trip and had to be manually reseated. This situation did not create an excessive cooldown transient and primary temperature and pressure remained within post-trip limits.

Shortly after the reactor trip, the control room operators observed that the first stage mechanical seal for RCP-1A had failed. A plant cooldown to Mode 5 was commenced to allow investigation and repair of the reactor coolant pump.

The inspectors reviewed the licensee's post-trip evaluation and have no further questions on this evaluation. The inspectors are continuing to follow repair activities for the pump. The Region II staff is conducting an inspection of the licensee's response to this event. That inspection will be documented in Report No. 50-302/86-04.

c. On January 10, 1986, the licensee contracted divers to clean and remove trash from the plant's intake structure, which provides cooling water to the plant from the Gulf of Mexico. During this period, the plant was in a cold shutdown (Mode 5) condition with reactor cooling being provided by the decay heat removal (DHR) system. The DHR system utilizes pumps (RWPs) that take water from the Gulf via the intake structure to provide a cooling heat sink.

At about 4:30 p.m., it was reported that one of the divers was missing. Shortly thereafter, it was reported that a second diver, who had gone into the water to look for the first diver, had died. During this time period, the running RWPs were secured thus leaving the plant without cooling water.

While attempts were underway to locate the missing diver, the plant operators cross-connected cooling systems to provide some plant cooling. At the beginning of this event, the reactor coolant temperature was approximately 95 degrees. With the main cooling water systems secured and other ancillary systems cross-connected, the reactor coolant system (RCS) began to heat up at a rate of approximately 30 to 35 degrees per hour. Because of this lack of cooling water, the licensee declared an Unusual Event at 6:40 p.m.

At approximately 7:32 p.m., the second diver was located in the vicinity of the RWPs and retrieved. Upon notification of the retrieval of the second diver, plant operators immediately restarted the RWPs and a normal plant cooldown was begun. The highest RCS temperature attained during the time the cooling water was secured was approximately 175 degrees. The plant secured the Unusual Event at approximately 8:00 p.m.

The inspector arrived onsite shortly after the first diver was found dead and monitored the licensee's activities with respect to the diver search and plant status. The licensee and personnel from the Occupational Safety and Health Administration (OSHA) are continuing to investigate this event.

This event involves a problem with industrial safety which is under the purview of OSHA. The NRC will review the OSHA findings to determine whether further actions are required.

This event will be tracked as IFI 302/85-44-08: Review the OSHA findings concerning the death of two divers while diving in the intake structure.

9. Review of Offsite Review Committee Activities

The inspector attended meetings and reviewed activities of the licensee's offsite review committee, the Nuclear General Review Committee (NGRC). This review included a determination that TS requirements were being met with regard to:

- committee quorum;
- committee composition with respect to disciplines and expertise;
- qualification of committee members; and
- review activities of the committee.

No violations or deviations were identified.