UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET SW SUITE 23T85
ATLANTA, GEORGIA 30303-8931

November 28, 2000

Mr. John P. Cowan, Vice President
Nuclear Operations
Florida Power Corporation (FPC)
ATTN: Manager Nuclear Licensing (NA1B)
Crystal River Energy Complex
15760 West Power Line Street
Crystal River FL 33428-6708

SUBJECT: CRYSTAL RIVER 3 - NRC SUPPLEMENTAL INSPECTION REPORT 50-302/00-07

Dear Mr. Cowan:

On November 1, 2000, the NRC completed an inspection at your Crystal River Unit 3 facility. The enclosed report documents the inspection findings which were discussed on November 13, 2000**,** with Mr. D. Roderick and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel. Specifically, this inspection reviewed activities related to increased reactor coolant system identified leakage. The leakage had been reported as a White performance indicator in the NRC's Reactor Oversight Program. This performance indicator was in the barrier integrity cornerstone of the reactor safety strategic performance area.

We found that your actions in response to the increased reactor coolant system leakage appropriately identified the causes of the leakage. Corrective actions have been completed which returned the indicator to the Green performance level. Additional corrective actions are planned.

No findings of significance were identified during the inspection.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/NRC/ADAMS/index.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Leonard D. Wert, Chief
Reactor Projects Branch 3
Division of Reactor Projects

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

Enclosure: NRC Supplemental Inspection Report 50-302/00-07

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REGION II

Docket No.	50-302
License No.	DPR-72
Report No:	50-302/00-07
Licensee:	Florida Power Corporation (FPC)
Facility:	Crystal River Unit 3
Location:	15760 West Power Line Road Crystal River, FL 34428-6708
Dates:	October 30 - November 1, 2000
Inspectors:	Scott Stewart, Senior Resident Inspector
Approved by:	Leonard Wert, Chief Reactor Projects Branch 3 Division of Reactor Projects

Enclosure

SUMMARY OF FINDINGS

IR 05000302-00-07, on 10/30-11/01/2000, Florida Power Corporation, Crystal River Unit 3. Supplemental inspection for increased reactor coolant system leakage which was reported as a White performance indicator. This inspection was conducted by the senior resident inspector and identified no significant findings. The significance of inspection findings would have been indicated by their color (green, white, yellow, red) using NRC Inspection Manual Chapter 0609 “Significance Determination Process”.

Cornerstone: Barrier Integrity

This supplemental inspection was performed to assess Florida Power Corporation’s activities associated with increased reactor coolant system leakage. The leakage exceeded the NRC’s Reactor Oversight Program White performance indicator threshold in August, 2000. The leakage remained above the threshold until September 9, 2000, when the plant was shutdown for repairs. This White indicator threshold is set at 50 percent of the leakage allowed by Technical Specifications and corresponds to a performance level that may result in increased NRC oversight.

Using Inspection Procedure 95001, the inspector found that the licensee’s root cause analysis for the leakage was acceptable and that the licensee had taken or planned appropriate corrective actions. The primary contributor to the leakage was identified as seat leakage thorough a pressurizer safety valve. Leakage from the pressure seal on a decay heat system valve also contributed to the overall reactor coolant system leakage. The licensee replaced the safety valve and conducted leak sealant repairs on the decay heat valve. These actions significantly reduced the reactor coolant system leakage and returned the performance indicator to the Green performance level. The licensee subsequently identified the root cause of the safety valve seat leakage and developed appropriate corrective actions. The licensee plans to complete permanent repairs to the decay heat valve at the next available opportunity.

Report Details

01 Inspection Scope

This supplemental inspection was performed in accordance with Inspection Procedure 95001, Inspection for One or Two White Inputs in a Strategic Performance Area. The inspector reviewed the licensee's root cause evaluations and the corrective actions associated with a White performance indicator in the reactor safety strategic performance area. The reactor coolant system identified leakage performance indicator exceeded the NRC's Reactor Oversight Program threshold of 50 percent of the Crystal River Improved Technical Specification limit (10 gallons per minute) in August and September 2000. This performance indicator is related to the barrier integrity cornerstone in the reactor safety strategic performance area. The inspector assessed the adequacy of the licensee's root cause determinations, determined if appropriate corrective actions were specified and scheduled commensurate with risk, and determined if the actions were sufficient to prevent recurrence. The inspection was completed by review of documents and discussions with licensee personnel. The root cause reports for Precursor Cards 3-C00-2130 (RCV-8) and 3-C00-1081 (DHV-3), were reviewed in detail.

02 Evaluation of Inspection Requirements

02.01 Problem Identification

a. Determination of under what conditions the issue was identified.

The licensee appropriately identified increased leakage from a pressurizer safety valve (RCV-8) and a decay heat system isolation valve (DHV-3) during routine surveillance testing required by Improved Technical Specification (ITS) 3.4.12, "Reactor Coolant System Operational Leakage". Before the seat leakage from RCV-8 exceeded one gallon per minute (gpm) in June, 2000, the licensee began to formally track leakage and plan corrective actions. The licensee correctly predicted that, when combined with the steady 1.3 gpm seal leakage from DHV-3, the performance indicator threshold of 50 percent of the ITS limit (corresponding to 5 gallons per minute), would be exceeded in August 2000.

b. Determination of how long the issue existed, and prior opportunities for identification.

The RCV-8 leakage increased at a slow rate from the time of discovery in March 2000 until September 8, 2000, when this leakage was 4.6 gpm. DHV-3 leakage, initially observed in April, 2000, remained relatively constant at 1.3 gpm. On September 9, 2000, the licensee completed a planned shutdown to make repairs. Although plant operation was continued after the leakage was identified, and the combined leakage caused the NRC performance indicator to become White, operational limits were not exceeded and safety margins were maintained. The licensee corrected the RCV-8 leakage by replacing the valve and attempted to reduce the DHV-3 leakage by temporary repairs during the plant shutdown.

c. Determination of the plant-specific risk consequences (as applicable) and compliance concerns associated with the issue.

The inspector found the licensee's risk evaluation to be acceptable and no compliance issues were identified. The licensee identified that the increased reactor coolant system (RCS) leakage rate was of minimal risk significance and determined that there were no significant implications in operating with the increased leakage. The leakage did not exceed technical specification limits and safety margins were maintained.

02.02 Root Cause and Extent of Condition Evaluation

a. Evaluation of methods used to identify root and contributing causes.

The support/refute method was effectively used by the licensee along with engineering evaluations to identify the root and contributing causes.

b. Level of detail of the root cause evaluation.

The level of detail in the root cause reports for RCV-8 and DHV-3 was acceptable. The root cause of the RCV-8 seat leakage was a combined inlet nozzle low torque and a thin disc seat inner lip. These factors combined to provide an increased probability of seating surface degradation during preoperational lift testing. The report stated that a contributing cause to the failure was an overly conservative set test pressure specified by the licensee during valve refurbishment. This specification necessitated a large number of pre-operational lift tests to establish the set pressure for the installed valve. In combination with the other causes, these tests may have initiated valve seat degradation.

The root causes of the DHV-3 leakage remained unknown in the root cause report, pending removal and evaluation of the valve internals. Postulated causes for the leakage were evaluated, a temporary repair was conducted, and permanent resolution of the leakage was planned. The location of DHV-3 necessitates a reactor shutdown and removal of fuel from the reactor in order to examine the valve internals.

c. Consideration of prior occurrences of the problem and knowledge of prior operating experience.

The licensee's evaluation of prior occurrences was appropriate. There were no relevant prior occurrences of the problem at Crystal River. In the root cause evaluation, the licensee identified that similar relief valve leakage problems due to inlet nozzle low torque had occurred at other nuclear facilities.

d. Consideration of potential common causes and extent of condition of the problem.

The licensee adequately considered the extent of condition of the RCV-8 leakage problem by assessing the condition of the redundant installed valve (RCV-9), warehouse spares, and other similar overpressure protection valves. The applicability of the root causes to valves of differing designs was also considered in the licensee's root cause report. An overall evaluation of seal ring type valves (similar to DHV-3) at Crystal River 3 was also in progress during this inspection.

02.03 Corrective Actions

a. Appropriateness of corrective actions

The licensee's completed and planned corrective actions appropriately addressed the root and contributing causes of the leakage problem. At the time leakage was detected, the licensee documented the increased leakage in the corrective action system and initiated root cause evaluations for both RCV-8 and DHV-3. After a plant shutdown on September 9, 2000, RCV-8 was replaced with a refurbished valve, allowing RCS leakage to return to normal operational values.

Licensee engineers observed the disassembly and inspection of the removed RCV-8 by the vendor. As a result of vendor evaluation and an evaluation by engineering, additional corrective actions were specified, including revision of the applicable valve refurbishment specifications, evaluation of other pressure relieving valves installed throughout the plant, and dialogue with the vendor organization including a request for corrective action related to the valve seat inner lip thickness issue.

During the plant shutdown, a temporary repair was attempted on DHV-3 to reduce its leakage. However, the leak sealant application was not effective and DHV-3 leakage remained essentially unchanged after the September outage. Replacement of DHV-3 would require that the reactor be defueled, although a proposed modification could be completed with the plant in cold shutdown. Licensee evaluation of these alternatives was in progress during the inspection. A permanent repair activity was planned for the next availability.

b. Prioritization of corrective actions

Corrective actions were prioritized appropriately so that no operational limits were exceeded while the leaking RCV-8 was in service. This leakage was stopped when the valve was replaced during a September 2000 plant shutdown. Temporary corrective actions were attempted for the DHV-3 leakage and long term corrective actions have been planned for the next availability. In both cases, long-term corrective actions to prevent recurrence were developed.

c. Establishment of schedule for implementing and completing the corrective actions

The licensee assigned and scheduled corrective actions appropriately to ensure timely completion. Formal tracking of corrective actions was implemented through the licensee's corrective action program.

d. Establishment of quantitative or qualitative measures of success for determining the effectiveness of the corrective actions to prevent recurrences.

As a measure of effectiveness of the corrective actions, the licensee continued to monitor RCS leakage and planned a review of the overall performance and corrective actions during the scheduled 2001 plant refueling outage.

03 <u>Management Meetings</u>

Exit Meeting Summary

The inspectors presented the inspection results to Mr. D. Roderick, Director, Nuclear Plant Operations, and other members of licensee management on November 13, 2000. The licensee acknowledged the inspection results. The inspectors asked the licensee whether any of the material examined during the inspection should be considered proprietary and no proprietary information was identified.

PERSONS CONTACTED

Licensee

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