

**May 6, 1999**

Mr. John P. Cowan, Vice President  
Nuclear Operations  
Florida Power Corporation  
ATTN: Manager Nuclear Licensing (NA1B)  
Crystal River Energy Complex  
15760 West Power Line Street  
Crystal River, FL 34428-6708

SUBJECT: NRC INSPECTION REPORT NO. 50-302/99-02

Dear Mr. Cowan:

This refers to the inspection conducted February 28 through April 10, 1999, at the Crystal River facility. The enclosed report presents the results of this inspection.

During the inspection period, your conduct of activities at the Crystal River facility was generally characterized by safety-conscious operations and well conducted maintenance and testing activities.

Based on the results of this inspection, the NRC has determined that three violations of NRC requirements occurred. These violations are being treated as Non-Cited Violations (NCVs), consistent with Appendix C of the Enforcement Policy. These NCVs are described in the enclosed report. If you contest the violation or severity level of these NCVs, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with copies to the Regional Administrator, Region II, and the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be placed in the NRC Public Document Room.

Sincerely,

**( Original signed by L. Wert )**

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

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

Enclosure: NRC Inspection Report No. 50-302/99-02

cc w/encl: (See page 2)

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cc w/encl:

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

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

Report No: 50-302/99-02

Licensee: Florida Power Corporation

Facility: Crystal River 3 Nuclear Station

Location: 15760 West Power Line Street  
Crystal River, FL 34428-6708

Dates: February 28 through April 10, 1999

Inspectors: S. Cahill, Senior Resident Inspector  
S. Sanchez, Resident Inspector  
B. Crowley, Reactor Inspector (Section M1.2)  
J. Kreh, Radiation Specialist (Section P1.1)

Approved by: L. Wert, Chief, Projects Branch 3  
Division of Reactor Projects

Enclosure

## EXECUTIVE SUMMARY

### Crystal River 3 Nuclear Station NRC Inspection Report 50-302/99-02

This integrated inspection included aspects of licensee operations, engineering, maintenance, and plant support. The report covers a six-week period of resident inspection; in addition, it includes the results of announced inspections by a regional reactor inspector and a regional radiation specialist.

#### Operations

- Improvements were made in Operations usage and interpretation of Technical Specifications (TS) by better screening of work, TS usage training, more tracking capability, and efforts to clarify TS Bases. However, Operations management expectations and processes for recording Limiting Condition for Operation entries were not yet fully refined. Recent problems involving correct TS usage and interpretation indicate that additional improvement is needed. (Section O4.1)
- The licensee identified several performance problems that were indicative of poor individual performance and process procedure adherence. A Non-Cited Violation was identified for an inadequate equipment tagout. Licensee response to these problems was prompt and follow-up investigations were meticulous and thorough. Some issues were also identified regarding the expectations and practices for independence of tagout preparer and verifier. (Section O4.2)
- A Non-Cited Violation was identified for failure to recognize that an emergency diesel generator was inoperable during maintenance activities which included tripping an engineered safeguards channel. This condition was identified and reported by the licensee in Licensee Event Report 50-302/98-10-00. (Section O8.1)
- A Non-Cited Violation was identified for failure to perform a technical specification required surveillance within the prescribed time limit when a diesel generator was removed from service. This condition was identified and reported by the licensee in Licensee Event Report 50-302/98-12-00. (Section O8.2)

#### Maintenance

- Performance of maintenance activities remained effective and pre-job briefs were conducted thoroughly. Planning and promulgation for important online system outages was thorough. Non-licensed operators displayed a strong questioning attitude during the fire protection system annual valve surveillance. (Section M1.1)
- Corrective maintenance, preventive maintenance activities, and surveillance testing were performed in a quality manner in accordance with procedures by knowledgeable and experienced personnel. Maintenance supervision was closely involved with work activities and effective interface between maintenance and operations personnel was observed. Detailed and thorough pre-job briefings were conducted for all work activities. Work activities were properly documented. (Section M1.2)

- In general, plant material condition was good. Equipment was painted and protected with little evidence of leaks or corrosion. Overall, housekeeping measures were effective. (Section M1.2)
- Maintenance Rule requirements had not been given proper attention by all affected plant departments. This indicated a declining awareness of the need for Maintenance Rule considerations when working on Maintenance Rule equipment. Precursor cards were written to correct this problem. (Section M1.2)

### Engineering

- The licensee addressed a long-standing issue with the position of two decay heat pump borated water storage tank suction valves. The valves were restored to the open position after the licensee effectively re-evaluated a separate 10 CFR 50 Appendix R hot short concern for the reactor building sump suction valves. (Section E8.1)

### Plant Support

- During a fire drill in the cable spreading room, fire brigade readiness and response was improved from previously observed drills. While some deficiencies with drill modeling and control were noted, the conduct of the critique was more structured than previously observed drills and participants were more involved. (Section F5.1)
- The licensee's emergency preparedness program was being maintained in a state of operational readiness. Changes to the program since the last inspection were consistent with commitments and NRC requirements, and did not decrease the licensee's overall state of preparedness. (Section P1.1)
- Deficiencies were identified with respect to the age and material condition of the licensee's stock of silver zeolite air-sampling cartridges. The licensee missed opportunities to identify this problem through either operational experience information or routine surveillance of emergency supplies. (Section P1.1)

## Report Details

### Summary of Plant Status

The plant began the inspection period at full rated power and remained at that level until the evening of April 3, 1999, when operators lowered power to 60% following a B condensate pump trip. The plant was restored to 100% power by midday, April 4, but was again lowered to 60% the evening of April 5 following another B condensate pump trip. Full power was restored on April 6 following replacement of the condensate pump motor brushes and remained at that level through the remainder of the period.

### **I. Operations**

#### **O1 Conduct of Operations**

##### **O1.1 Routine Conduct of Operations Reviews (71707)**

Using Inspection Procedure 71707, the inspectors performed routine reviews of plant operations which included plant tours, shift turnovers, log reviews, response to emergent problems, implementation and interpretation of Technical Specifications (TS), daily meetings, and control room observations. Noteworthy observations are discussed in subsequent paragraphs.

#### **O4 Operator Knowledge and Performance**

##### **O4.1 Technical Specification Interpretation and Application Issues**

###### **a. Inspection Scope (92901, 71707)**

The inspectors performed a review of the licensee's corrective actions to address several problems with the use and interpretation of TS. The problems were licensee-identified or self-revealing and resulted in two Licensee Event Reports (LER), LERs 50-302/98-10-00 and 50-302/98-12-00, as well as several other items in the licensee's Corrective Action Program (CAP). The inspectors reviewed the details of each problem and the licensee's corrective actions, interviewed operators, and reviewed TS usage to verify the adequacy and implementation of the corrective actions.

###### **b. Observations and Findings**

The inspectors observed and reviewed the details of several minor but repetitive problems with operator use and interpretation of TS dating back to mid-1998, which were also documented on precursor cards (PC) in the licensee's corrective action system. Following the problems detailed in LERs 50-302/98-10-00 and 50-302/98-12-00, Operations management aggregated the TS problems to determine root causes and implement a comprehensive solution. The types of problems were documentation errors, failure to recognize TS applicability for components out of service, and interpretation errors, all of which were included in the comprehensive corrective action plan. Consequently, the inspectors focused subsequent review efforts on the comprehensive licensee plan and the details of the two LERs. Additional discussion of the LERs is included in Sections O8.1 and O8.2.

LER 50-302/98-10-00 involved a failure of operations personnel to recognize the applicability of emergency diesel generator (EDG) TS 3.8.1 when an engineered safeguards (ES) time delay relay malfunctioned. The licensee attributed the problem to difficulty in applying TS and poor operator knowledge of TS and the ES relay role in EDG loading. LER 50-302/98-12-00 involved a delay in completing the TS Limiting Condition for Operation (LCO) 3.8.1 actions when the EDG was removed from service for routine maintenance. Operators recognized the LCO was applicable, but due to distractions from the maintenance and shift turnover, and the lack of a formal LCO tracking process, the required actions were not completed within one hour. There was no safety significance to the omitted LCO verifications because the required components were operable and correctly aligned.

Corrective actions for both items included discussion with involved operators, promulgation of the events to other operators, and formal TS training. The inspectors verified the discussion and promulgation actions occurred appropriately and attended a session of the formal TS training. The inspectors determined that the contractor-provided training, which focused on Improved TS usage techniques, was of good quality, well received by those in attendance, and improved the knowledge of the licensed operators. The licensee also provided training via routine distribution of TS Questionnaire Worksheets and planned to continue the questionnaire training throughout the year. The inspectors observed that Operations and Licensing were coordinating efforts to clarify the TS Bases for problems identified in these reviews.

Another corrective action was to develop an improved method of formally tracking LCO entries. The licensee previously relied on the control room senior reactor operator (SRO) and the Nuclear Shift Manager (NSM) to recognize LCO entries and track them via entries in their routine narrative logs. The licensee benchmarked methods used by other plants to track and screen TS LCO entries and then revised their process delineated in Operations Instruction (OI) 7, Control of System and Equipment Status. The improvements included enhancing Equipment Out-of-Service (OOS) Log tracking, pre-screening of planned work for TS implications, and enhanced guidance to SROs for unplanned TS entries. The inspectors determined that the improvements enhanced the operators' TS implementation and the pre-screening of scheduled work added another barrier to unrecognized TS applicability errors. The inspectors observed that the licensee did not establish a single tracking system for TS LCO entries. Operators' narrative logs remained as the required method to record LCO entries, although there were numerous other places operators were expected to record an LCO.

The inspectors reviewed surveillance procedure (SP) 442, Special Conditions Surveillance Plan, and found it cumbersome to read and implement. The procedure directed reference to TS and other requirements for unplanned equipment problems, and also directed an operator review every four hours to verify no unexpected requirements were applicable. The inspectors interviewed operators on SP-442 use in other unplanned situations and determined it had not identified any pertinent requirements not already implemented elsewhere, such as procedures. After discussing the expectations for SP-442 usage with the inspectors, Operations management noted the redundant role of the procedure was not clear and indicated that its effectiveness would be evaluated.

The inspectors noted that other problems had occurred in recent months involving TS interpretation and applicability. During routine plant observations, the inspectors questioned some recent operator TS determinations. On March 9, 1999, a valve in the decay heat system (DH) cross-tie line was removed from service and three SROs did not understand why an LCO entry was not required. They were unaware of existing engineering guidance on the LCO entry applicability. On March 31, 1999, a 4-hour TS LCO was not entered during maintenance activities on an ES relay (refer to Section O4.2 for more details). On April 2, 1999, the DH pump room fire detection alarm actuated. Operators verified the alarm was invalid but did not recognize that the room fire detection alarm function had been rendered inoperable with the false alarm locked in. The detection system did not have reflash capability and would not have alarmed for an actual condition. With this detection system inoperable, Table 6.5a of the Fire Protection Plan (FPP) requires that an hourly roving fire watch be established. Approximately 10 hours later, the Auxiliary Building operator questioned the alarm and the actions of the FPP were recognized and implemented. Although the licensee did not modify an existing roving fire watch's route to specifically check the DH pump room, the fire watch patrol passed within six feet of the room's open hatch and would have noted a fire or smoke. This failure constitutes a violation of minor significance and is not subject to formal enforcement action. The licensee initiated PC 99-1120 to address this issue.

c. Conclusions

Improvements were made in Operations usage and interpretation of TS by better screening of work, TS usage training, more tracking capability, and efforts to clarify TS Bases. However, Operations management expectations and processes for recording LCO entries were not yet fully refined. Recent problems involving correct TS usage and interpretation indicate that additional improvement is needed.

O4.2 Operator Performance Problems

a. Inspection Scope (71707)

The inspectors reviewed the licensee's investigations and corrective actions for several licensee-identified issues that were indicative of individual performance problems. The inspectors also independently verified portions of the investigation results and interviewed operators involved with some of the errors.

b. Observations and Findings

The first and most significant example involved an inadequate clearance tagout for a fire service pump battery charger replacement. After properly having a work order approved and signing on to the clearance, electricians discovered the battery charger energized as they prepared to begin the work. The licensee initiated an immediate investigation. The inadequate tagout was due to a revision in the work scope, from troubleshooting of the battery charger to replacement, that was not incorporated into the tagout. After the troubleshooting, the work order was properly revised and a new tagout requested. The operator preparing the new tagout recognized the work scope had been revised and annotated charger replacement on the clearance tagout cover sheet. However, instead of generating a new tagout boundary, he copied the previous troubleshooting tagout,

which did not remove all power from the charger. A second operator assigned to independently verify the adequacy of the clearance did not identify the error. His review had raised another concern with the tagging sequence of the clearance, which caused the operator to consult with the preparer of the tagout, thus questioning the independence of his review. This also caused the operator to omit the required action to verify the adequacy of the clearance for the work scope.

The inspector reviewed Compliance Procedure (CP) 115A, Operations Danger Tagouts, and observed that it clearly defined the responsibilities of the individuals preparing and verifying clearances. Section 3.2 stated that the utmost responsibility for both individuals was to ensure the system or component bounded by the tagout is in a safe configuration before allowing maintenance to be performed. Section 4.4.1 also provided guidance for use of previous tagouts, stating that they could be used for reference, but that a review of the boundaries for adequacy must still be done. These requirements were not accomplished which resulted in an inadequate clearance tagout. Technical Specification 5.6.1.1 requires that written procedures be established, implemented, and maintained for the activities recommended in Appendix A of Regulatory Guide 1.33, Revision 2, February 1978. This includes procedures required for the tagging and control of plant equipment, such as CP-115. The above licensee-identified errors were contrary to the requirements of CP-115. This Severity Level IV violation is being treated as a Non-Cited Violation, consistent with Appendix C of the NRC Enforcement Policy, and will be referenced as NCV 50-302/99-02-01, Inadequate Battery Charger Tagout Results in Energized Equipment Approved for Maintenance. This violation occurred on March 2, 1999 and is in the licensee's corrective action program as Precursor Card (PC) 99-0717.

The second example involved an unrecognized 4-hour TS Limiting Condition for Operation (LCO) applicability. Replacement of an Engineered Safeguards (ES) relay on March 31, 1999, was pre-screened by the OI-7 process discussed in Section O4.1 as requiring entry only into TS 3.3.7. However, the operator hanging the relay clearance tag noted that the Decay Heat (DH) system Automatic Closure and Interlock System (ACIS) was impacted by the relay and TS 3.4.13, Condition C was also applicable. The shift appropriately entered the TS. The operators recognized that a similar evolution had occurred on the other ES train on March 18, and the ACIS TS had not been entered. ACIS functions to close the DH system drop line valves on high pressure to protect the DH system from reactor coolant system pressure. The licensee initiated an Operations investigation and PC 99-1098. The inspector noted that the investigation was very thorough and identified appropriate corrective actions. The investigation determined that numerous opportunities to avert the TS error were missed. The March 18 unrecognized entry did not result in a violation of regulatory requirements because the relay was expeditiously repaired and ACIS was inoperable for only 2 hours and 21 minutes. TS 3.4.13, Condition C required action to isolate the affected DH line by a manually closed and de-energized valve after 4 hours had elapsed. The licensee also verified that the ACIS TS was appropriately recognized and entered for other previous maintenance on the relays in the past three years. Although good questioning by an operator identified the problem, numerous personnel performance issues had caused the problem.

The third example involved two DH pump suction gauge isolation valves which were not correctly positioned after caution tags were removed from the valves. A personnel error occurred during a subsequent position verification. The significance of this error was minimal since the gauges were for local indication, and only needed for non-emergency plant shutdown operation.

The inspectors observed that each of these problems were licensee-identified and that immediate corrective actions were prompt and investigations were very thorough. The licensee addressed each problem appropriately without any inspector involvement. For each of these problems, the inspectors observed that the involved operational processes were clear and appropriate. Each problem was attributable to personnel not fulfilling accountable procedural responsibilities. This was a departure from previous inspection observations which noted operators were fundamentally sound but operational processes were weak. Some of the examples also identified concerns regarding the independence of initial reviewer and verifier efforts. Operations management was considering improvements in independent verification expectations.

c. Conclusions

The licensee identified several performance problems that were indicative of poor individual performance and process procedure adherence. A Non-Cited Violation was identified for an inadequate equipment tagout. Licensee response to these problems was prompt and follow-up investigations were meticulous and thorough. Some issues were also identified regarding the expectations and practices for independence of preparer and verifier efforts.

**O8 Miscellaneous Operations Issues (92901)**

- O8.1 (Closed) LER 50-302/98-10-00: Required Actions of Improved Technical Specifications Were Not Recognized Due to Personnel Error. Additional discussion is included in Section O4.1. The failure to recognize the impact of the failure of a time delay diesel block loading relay and complete the TS 3.8.1 Limiting Condition for Operation (LCO) actions is a violation of the TS requirements. Since the emergency feed pump and offsite power that the TS LCO directed to be verified were available, the safety significance of the problem was minimal. However, operators did not recognize the EDG was rendered inoperable by tripping of the ES channel. The inspectors considered the problem of recognizing TS applicability to be more than an isolated occurrence. This Severity Level IV violation is being treated as a Non-Cited Violation, consistent with Appendix C of the NRC Enforcement Policy, and will be referenced as NCV 50-302/99-02-02, Diesel Generator Technical Specification Applicability Not Recognized. This violation occurred on October 8, 1998 and is in the licensee's corrective action program as precursor card 98-4619. This LER is closed.
- O8.2 (Closed) LER 50-302/98-12-00: Personnel Error Causes Delay in Performance of Improved Technical Specifications Required Actions. Additional discussion is included in Section O4.1. Although the omitted verification actions were a violation of the TS 3.8.1 LCO, there was minimal safety significance because the emergency feed pump and offsite power circuits were operable. The LCO applicability was recognized but an

error occurred in implementation of the requirements. This Severity Level IV violation is being treated as a Non-Cited Violation, consistent with Appendix C of the NRC Enforcement Policy, and will be referenced as NCV 50-302/99-02-03, Surveillance for Inoperable Emergency Diesel Generator not Completed Within Required Time Limit. This violation occurred on November 9, 1998 and is in the licensee's corrective action program as precursor card 98-5059. This LER is closed.

- O8.3 The NRC recently revised NUREG-1600, Rev.1, "General Statement of Policy and Procedures for NRC Enforcement Actions," (Enforcement Policy) by the addition of Appendix C. Appendix C, Interim Enforcement Policy for Power Reactor Severity Level IV Violations, effective March 11, 1999, revises the NRC's enforcement approach for Severity Level IV violations. Appendix C permits closure of most Severity Level IV Violations, based on the violation being entered into the licensee's corrective action program, as well as other considerations as described in the Appendix. The NRC has conducted a review of the following Severity Level IV violations, and considers it appropriate to close these violations consistent with Appendix C of the Enforcement Policy:

<u>Violation Number</u>	<u>Corrective Action Program File Number</u>
VIO 50-302/97-16-03	PC 97-1515
VIO 50-302/98-03-01	PC 98-1143
VIO 50-302/98-10-01	PC 98-5169

Violations 50-302/97-12-02, 98-02-01, and 98-02-09 will remain open for further NRC review of plant modifications scheduled for implementation in the October 1999 refueling outage to ensure that all regulatory concerns are resolved.

## **II. Maintenance**

### **M1 Conduct of Maintenance**

#### M1.1 Routine Observations

##### a. Inspection Scope (62707, 61726)

Using Inspection Procedures 62707 and 61726, the inspectors observed various portions of several corrective maintenance tasks and surveillance tests, verified clearance tagout boundaries, and reviewed work package documentation.

##### b. Observations and Findings

The inspectors observed that pre-job briefings remained thorough. Supervisory and component engineering oversight of job progress was frequent. Work was routinely performed with the work packages present and in active use. The inspectors occasionally found package guidance difficult to interpret, particularly when a pre-existing Maintenance Procedure was utilized within a work package. In all observed cases, the actual work performed was done well and appropriate references were used

for items such as torque values and replacement parts. Work observed included a decay heat and closed-cycle decay heat cooling system (DC) outage on March 9 and 10, which included work request (WR) 356871 for DC heat exchanger A head replacement. The inspectors observed that this significant system outage was planned and scheduled well. Outage entry into a heightened risk awareness plant Condition Yellow was well promulgated and defined to all plant personnel.

During the performance of surveillance procedure SP-366, Fire System Annual Valve Surveillance, Non-licensed Operators (NLOs) identified a step in the procedure that if performed, could have inadvertently started the fire service pumps due to a decreased system pressure. After the NLOs consulted with the shift supervisor and a Fire Protection (FP) engineer, an immediate working copy change was written and implemented prior to resuming performance of the procedure. The NLOs also identified that a portion of the fire system for the new Plant Administrative Building (PAB) was not included in the surveillance. After review by the FP engineer, it was determined that after the Modification Approval Record (MAR) was turned over to Operations, 180 days was allowed before the procedure revision had to be implemented. This was normal for the MAR turnover process. In addition, prior to final MAR turnover, the PAB portion of the system was functionally tested satisfactorily. The NLOs displayed a strong questioning attitude and no further concerns were noted.

c. Conclusions

Performance of maintenance activities remained effective and pre-job briefs were conducted thoroughly. Planning and promulgation for important online system outages was thorough. Non-licensed operators displayed a strong questioning attitude during the fire protection system annual valve surveillance.

M1.2 Maintenance and Surveillance Observations

a. Inspection Scope (62700)

The inspector observed portions of the following corrective maintenance, preventive maintenance (PM) and surveillance testing activities:

- Work Request (WR) NU 0357798, Replace Makeup System Differential Pressure Transmitter MU-24-DPT2
- WR NU 0352809, PM on Motor Driven Fire Service Pump FSP-1
- WR NU 0348815, Re-install After Refurbishment, Intermediate Building Exhaust Fan AHF-29B
- WR NU 0359275, PM on Control Rod Drive System Control Equipment DRRD-1
- WR NU 0359028, Replace Defective Battery Charger for Diesel Driven Fire Service Pump FSP-2B
- SP-907B, Monthly Functional Test of 4160V Engineered Safeguards (ES) Bus "A" Undervoltage and Degraded Grid Relaying
- SP-108, Reactor Trip Module and Control Rod Drive Trip Functional Test

In addition to observation of the above work activities, the inspector reviewed the following completed safety-related corrective maintenance WRs:

- NU 0359057, Troubleshoot ES System Actuation Trouble Signal, Cabinet ESCC-3
- NU 0358786, Repair Damaged Circuitry in Oil Heater for HVAC Chiller CHHE-1B
- NU 0355356, Replace Sticking RPS (High RCS Pressure) Reset Bistable switch RP-B32
- NU 0358643, Replace Indication Relay for PASS Containment Isolation Valve CAV-431
- NU 0348351, Repair Service Water Valve SWV-287
- NU 0358294, Replace Failed RPS (High RCS Pressure) Bistable RP-D34
- NU 0354774, Replace Fire Service Valve FSV-747
- NU 0356864, Troubleshoot Control Complex Heater CHHE-1A-CCB-OHTR-1
- NU 0356789, Replace Failed Relay ESCP-4A-AQ for High Pressure Injection "A" ES Channel RC1
- NU 0355448, Replace Failed Relay ESCP-5C-AQ for High Pressure Injection "B" ES Channel RC3
- NU 0355463, Replace Failed Relay ESCP-5C-AV for High Pressure Injection "B" ES Channel RC3
- NU 0359664, Replace Main Steam, Steam Generator 1A, Channel B Pressure Transmitter MS-107-PT

b. Observations and Findings

All observed corrective maintenance, PM activities, and surveillance testing were performed in a quality manner in accordance with work instructions and procedures. Work performed during these activities was accomplished by knowledgeable and experienced personnel who were familiar with their specific tasks. Detailed and thorough pre-job briefings were conducted for all work activities. The work package or procedure was routinely present and in active use at the work site. The inspector observed that maintenance supervision was closely involved with the maintenance work. Good interface between maintenance and operations personnel was observed. The inspector also observed that work activities were properly documented and problems encountered during the performance of the work activities were appropriately resolved.

In general, plant material condition was good. Equipment was painted and protected with little evidence of leaks or corrosion. Overall, housekeeping measures were effective. However, a few areas were noted where excessive dust and small items of trash had been allowed to accumulate. These were pointed out to the licensee.

During review of the above listed completed corrective maintenance WRs, the inspector evaluated the licensee's implementation of the Maintenance Rule relative to equipment failures. During this review, it was noted that three of the WRs (NU 0355448, NU 0355463, and NU 0356789) were for failed Agastat relays in the ES system. The relays were used in the Emergency Diesel Generator (EDG) block loading sequencing logic. When questioned by the inspector, the licensee provided Precursor Card (PC) 3-C98-4117, dated September 8, 1998, which identified that 11 failures had occurred with the same type relay in the ES system. Seven failures had occurred over the previous two

years resulting in the ES system exceeding its Maintenance Rule performance criteria of six functional failures over a 2-year period. The system was appropriately placed in category (a)(1) of the Maintenance Rule and corrective actions and goal setting implemented. Corrective actions (replacement of all of the ES system Agastat relays - scheduled for March 1999) and goal setting appeared to be appropriate. The licensee's program for the ES system required monitoring at the channel level to preclude masking equipment problems. Therefore, failure of an individual channel because of a failed relay, although not a loss of function of the system, was considered a functional failure. PC 3-C98-5221 had been issued on November 23, 1998 for not moving the ES system to (a)(1) status when repetitive failures of Agastat relays occurred in 1997.

In addition to the problem with the delay in moving the ES system to (a)(1) status, the licensee identified other recent problems with implementation of the Maintenance Rule. One problem occurred when performance of SP-398A for Gammametrics Power Output Systems NI-14-NY2 and NI-15-NY2 placed anticipated transient without a scram (ATWS) in bypass. This was the first time that the SP was performed online and maintenance was unaware of the unavailability criteria. This problem was documented on PC99-0572. Another problem, documented on PC99-0300, involved not moving the Waste Transfer Pump to (a)(1) status after repeat pump failures. Based on review of the above PCs and discussions with plant personnel, the inspector concluded that Maintenance Rule requirements had not been given proper attention by all affected plant departments. This indicated a declining awareness of the need for Maintenance Rule considerations when working on Maintenance Rule equipment. The licensee agreed with this assessment based on their own identification of Maintenance Rule problems, and stated that improvements, including additional training, were planned as part of the corrective actions for the above PCs to ensure that all plant departments understand their roll in Maintenance Rule compliance.

c. Conclusions

All observed corrective maintenance, PM activities and surveillance testing were performed in a quality manner in accordance with procedures by knowledgeable and experienced personnel. Maintenance supervision was closely involved with work activities and effective interface between maintenance and operations personnel was observed. Detailed and thorough pre-job briefings were conducted for all work activities. Work activities were properly documented.

In general, plant material condition was good. Equipment was painted and protected with little evidence of leaks or corrosion. Overall, housekeeping measures were effective.

Maintenance Rule requirements had not been given proper attention by all affected plant departments. This indicated a declining awareness of the need for Maintenance Rule considerations when working on Maintenance Rule equipment. Precursor cards were written to correct this problem.

### III. Engineering

#### **E8 Miscellaneous Engineering Issues (92903, 37551)**

- E8.1 (Closed) VIO 50-302/97-14-13: Failure to Take Adequate Corrective Actions to Identify and Correct the Design Weaknesses Associated with Adequacy of the Past 10 CFR 50.59 Review for Positioning of DHV-34 and DHV-35 During Normal Operation. In 1985 the licensee changed the normal position of valves DHV-34 and DHV-35, the decay heat removal system (DH) and building spray (BS) suction valves from the borated water storage tank (BWST), from open to closed. The change addressed Appendix R hot short fire protection concerns. It created an unreviewed safety question (USQ) and therefore needed NRC staff review and approval. In September 1996, the licensee identified that the 1985 safety evaluation was inadequate and had not identified the USQ. Since a new safety evaluation was not done as of November 1997, this violation was cited for maintaining DHV-34 and DHV-35 in the "closed" position without an adequate safety evaluation. The licensee evaluated the DH and BS systems as operable and issued a Justification for Continued Operation (JCO) supporting further operation with the valves shut. These evaluations were previously inspected as documented in Inspection Reports 50-302/97-19, 98-06, and 98-09. The licensee completed an integrated engineering study of the DH system in October 1998 which concluded the valves should remain closed. To address the USQ, the licensee submitted License Amendment Request (LAR) 229 to allow DHV-34 and DHV-35 to remain closed.

The licensee resolved the Appendix R hot short concern and opened DHV-34 and 35, which was the desired position for accident mitigation. The hot short concern involved corresponding reactor building (RB) sump to DH pump suction valves DHV-41 and 42. A fire-induced spurious hot short on the power to either of these valve's motor operator could cause them to open, which would then allow the contents of the BWST to flow to the RB sump if DHV-34 or 35 were open. To prevent this, the inspector verified the licensee proceduralized manual actions in fire procedures to close DHV-34 and 35. Emergency lighting was installed to support these actions. In case the BWST inventory was transferred to the RB sump, guidance in normal operating procedures was referenced to transfer the water back to the BWST. The inspector did not identify any regulatory concerns. In conclusion, the licensee addressed a long-standing issue with the position of DH pump suction valves from the BWST. The valves were restored to the desired open position after the licensee effectively re-evaluated a separate 10 CFR 50 Appendix R hot short fire concern for the corresponding RB sump valves.

- E8.2 (Closed) Inspection Followup Item (IFI) 50-302/98-11-03: Adequacy of Freeze Protection for the Borated Water Storage Tank (BWST) Level Transmitters. The licensee utilized conservative assumptions in a revised temperature profile calculation for the room housing the BWST transmitters. The inspector verified the calculation bounded the expected worst case ambient temperature cycle and justified the licensee determination that the transmitters were not subject to freezing. The licensee's assumptions and revised calculation adequately resolved the original concern and no additional concerns were noted. This IFI is closed.

#### IV. Plant Support

### **P1 Conduct of Emergency Preparedness (EP) Activities**

#### **P1.1 Review of EP Program**

##### **a. Inspection Scope (82701)**

During the period March 22-26, 1999, the inspectors reviewed EP program activities to determine whether the licensee's emergency response capability was maintained in a state of operational readiness, and to determine whether changes to the program since the last such inspection (June 1997) met commitments and NRC requirements.

##### **b. Observations and Findings**

In the period since June 1997, the licensee issued Revision 18 to the Radiological Emergency Response Plan (RERP). The inspectors selectively reviewed the changes made in this revision. This RERP revision was submitted to the NRC in accordance with regulatory requirements, as were revisions to the RERP implementing procedures. Revision 18 did not include changes which decreased the effectiveness of the RERP, and had no adverse impact on the licensee's level of emergency preparedness.

One emergency declaration occurred since the last inspection as a result of a chlorine leak on February 9, 1998, at one of the adjacent coal-fired power plants. The inspectors examined documentation of this Notification of Unusual Event declaration and concluded that the event was correctly categorized based on the licensee's emergency classification criteria. Notifications to offsite authorities were made in accordance with applicable requirements.

Emergency response facilities (ERFs), equipment, instrumentation, and supplies were inspected and found to be well maintained with one exception described below. Extensive renovations to the Technical Support Center (TSC) and Operational Support Center (OSC) were completed in late 1997. The Emergency Operations Facility (EOF) also received various upgrades at that time. The TSC and EOF were state-of-the-art facilities in all significant respects, including capability for displaying and trending plant data. The OSC was adjacent to the TSC and was well equipped to support its designated functions. The licensee's ERFs were observed to operate effectively during the October 1998 NRC-evaluated emergency response exercise.

Periodic surveillances of emergency response equipment and supplies were performed in accordance with licensee procedures. However, the inspectors identified a specific deficiency in the licensee's emergency supplies. A stock of silver zeolite cartridges was maintained in several emergency kits, including those at the Control Room, the TSC/OSC, and for the radiological monitoring teams. These cartridges would be used in air samplers as a medium for detecting radioiodine in the atmosphere in the event of a radiological release. The cartridges were typically supplied by the vendor in packages of 10, sealed in heavy-duty 10-mil plastic sleeves to maximize shelf life (rated at 10 years). The material condition of the silver zeolite cartridges examined by the

inspectors ranged from satisfactory (the TSC/OSC kit) to poor (the Control Room kit). None of the inspected cartridges (or their packaging) carried any indication of manufacturing date or shelf-life expiration date, nor did the licensee produce any records which contained this information. The inspectors questioned whether any of the licensee's silver zeolite cartridges were within their rated 10-year shelf life. The licensee initiated Precursor Card (PC) No. 3-C99-0997 to ensure follow-up and corrective action as necessary. (Subsequent to the inspection, the Manager, Radiological Emergency Planning [REP] informed the inspectors that fresh silver zeolite cartridges were obtained and installed in all kits by March 30, 1999.)

During the exit meeting with licensee management, the inspectors discussed two broader issues related to the above specific concerns with silver zeolite cartridges. Through industry contacts, the licensee learned more than one year ago that this issue had been identified at other facilities, but this concern was not entered into the Corrective Action Process (CAP) and appropriate follow-up did not occur. Secondly, Health Physics (HP) procedure HPP-409, Inventory and Availability of Emergency Supplies/ Equipment, Revision 15, included limited direction to users (normally HP technicians) regarding the need to evaluate the material condition of equipment and supplies in addition to ensuring the presence of specified minimum quantities. This lack of appropriate guidance represented a vulnerability in the licensee's surveillance program for emergency equipment and supplies.

The public-notification system comprised 40 sirens which were tested at full volume every Friday at 12:00 p.m. (holidays excepted). Siren-system performance data submitted to the Federal Emergency Management Agency (FEMA) indicated that overall system reliability was 96.1 percent for 1997 and 95.6 percent for 1998, exceeding the FEMA acceptance criterion of 90 percent. The performance data were derived from the weekly full-volume test and daily electronic polling conducted by Citrus County personnel.

Organizational and management control of the EP program was unchanged since the last inspection, with the exception of the appointment of a new Director, Nuclear Regulatory Affairs (the position to which the Manager, REP reported) in September 1998. Interviews with EP staff and review of program initiatives and accomplishments (most notably the renovation of ERFs) indicated continuing strong management support for the EP program at Crystal River.

The inspectors reviewed RERP Section 19 regarding the training program for the emergency response organization (ERO) and related procedures. In May 1997, the licensee began a program of quarterly ERO drills integrated with licensed operator requalification (LOR) training using the Control Room simulator in the active mode to provide real-time (simulated) plant data to the TSC, OSC, and EOF. Although ERO qualification standards did not include annual drill participation, the schedule of quarterly drills allowed for annual drill participation by most principal members of the ERO. Many areas and items for improvement emerged from the drill critiques. The inspectors audited selected segments of an Emergency Coordinator training class and an LOR training session on EP issues. Both presentations (given by the Manager, REP) were authoritative and well received, and generated useful class discussion.

The inspectors reviewed Audit Reports 97-10 and 98-10, for 1997 and 1998, respectively, and concluded that the audits, conducted by the Nuclear Quality Assessments group, were comprehensive and met NRC requirements contained in 10 CFR 50.54(t). In addition, "Quality Programs Surveillances" were periodically performed in focused areas, such as implementation of Severe Accident Management Guidelines, offsite interfaces, ERO ability to provide required minimum staffing, and the exercised critique process. Meaningful issues were identified by these audits, and resultant corrective actions were thorough and timely.

Licensee findings resulting from activities such as exercises, drills, self-assessments, and audits were entered in the CAP system to ensure follow-up and resolution. Of the 20 PCs that resulted from the critique of the biennial exercise on October 14, 1998, only one was still open as of March 25, 1999. Detailed review of five of those PCs determined that problems and issues were thoroughly investigated, and appropriate corrective actions were pursued and implemented. Management commitment and attention to timely corrective actions for identified problems in EP were evident from the nature of the measures taken to resolve problems.

c. Conclusions

The licensee's emergency preparedness program was being maintained in a state of operational readiness. Changes to the program since the last inspection were consistent with commitments and NRC requirements, and did not decrease the licensee's overall state of preparedness. Deficiencies were identified with respect to the age and material condition of the licensee's stock of silver zeolite air-sampling cartridges. The licensee missed opportunities to identify this problem through either operational experience information or routine surveillance of emergency supplies.

**R8 Miscellaneous RP&C Issues (92904)**

- R8.1 (Closed) Licensee Event Report (LER) 50-302/99-02-00: Contaminated Clothing Leads to Exceedance of a Radiological Dose Rate Limit of 10 CFR 20.1301. The licensee reported this event because a 0.12 microcurie discrete particle was found lodged in the jacket of a contract worker exiting the protected area. The worker, who had not been in the licensee's radiological control area, indicated he suspected the particle came from a foreign plant that he had visited previously which had higher discrete particle release limits. The licensee dose rate estimate for the worker was 0.0301 rem per hour, exceeding the 10 CFR 20 limit of 0.0200 rem per hour to any member of the public. The LER stated that the particle apparently came from a foreign plant. The licensee completed all appropriate actions and did not violate any regulatory requirements. This item is closed.

**F5 Fire Protection Staff Training and Qualification****F5.1 Cable Spread Room Fire Drill****a. Inspection Scope (71750)**

The inspectors observed a fire brigade drill conducted in the cable spread room on March 17, 1999. The location of the drill was unannounced and was conducted by members of the licensee Fire Protection (FP) training staff.

**b. Observations and Findings**

Fire brigade response following the site announcement was quick, with members dressed within two minutes and at the scene several minutes later. Brigade member equipment readiness was very good with only very minor deficiencies observed. This was an improvement from previous inspector observations. The fire was not modeled in any way as an electrical or scrap material fire and feedback on the type of fire was not given to the team members. Consequently, no effort was made to de-energize electrical equipment or consider the source of burning material by the brigade. The inspector noted a reflash watch had not been established once the fire was extinguished, so the brigade was not certain the fire had not reinitiated before establishing ventilation. The main control room informed the brigade leader that the cable spread room halon system had been actuated. The drill initial condition sheets had annotated the halon system as out of service but the control room was not provided a copy of the initial conditions. This unnecessarily delayed the brigade response to the fire, resulting in approximately 15 minutes from the initial report of the fire to an extinguishing agent being applied.

A drill critique was conducted shortly after the drill. A formal agenda was used by the training instructors. All of the above deficiencies were discussed. Ownership of FP equipment and fire brigade strategy between the training staff and FP engineers was not clear at the critique. FP management subsequently emphasized that FP engineers were the ultimate owners of all FP issues. The inspectors observed that the FP engineers have since clearly filled this role.

**c. Conclusions**

During a fire drill in the cable spreading room, fire brigade readiness and response was improved from previously observed drills. While some deficiencies with drill modeling and control were noted, the conduct of the critique was more structured than previously observed drills and participants were more involved.

## V. Management Meetings

### **X1 Exit Meeting Summary**

The inspection scope and findings were summarized on April 9, 1999. Proprietary information is not contained in this report. Dissenting comments were not received from the licensee.

### **PARTIAL LIST OF PERSONS CONTACTED**

#### **Licensees**

S. Bernhoft, Director, Nuclear Regulatory Affairs  
 J. Cowan, Vice President, Nuclear Operations  
 R. Davis, Assistant Plant Director, Operations  
 R. Grazio, Director, Nuclear Site and Business Support  
 G. Halnon, Director, Nuclear Quality Programs  
 J. Holden, Vice President and Director, Site Nuclear Operations  
 C. Pardee, Director, Nuclear Plant Operations  
 D. Roderick, Director, Nuclear Engineering & Projects  
 M. Schiavoni, Assistant Plant Director, Maintenance  
 T. Taylor, Director, Nuclear Operations Training

#### **NRC**

B. Crowley, Reactor Inspector, Region II (March 1-5, 1999)  
 J. Kreh, Radiation Specialist, Region II (March 22-26, 1999)

### **INSPECTION PROCEDURES USED**

IP 37551: Onsite Engineering  
 IP 61726: Surveillance Observations  
 IP 62700: Maintenance Implementation  
 IP 62707: Conduct of Maintenance  
 IP 71707: Plant Operations  
 IP 71750: Plant Support Activities  
 IP 82701: Operational Status of the Emergency Preparedness Program  
 IP 92901: Followup - Operations  
 IP 92903: Followup - Engineering  
 IP 92904: Followup - Plant Support

### **ITEMS OPENED, CLOSED, AND DISCUSSED**

#### **Opened**

50-302/99-02-01	NCV	Inadequate Battery Charger Tagout Results in Energized Equipment Approved for Maintenance. (Section O4.2)
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- 50-302/99-02-02 NCV Diesel Generator Technical Specification Applicability Not Recognized. (Section O8.1)
- 50-302/99-02-03 NCV Surveillance for Inoperable Emergency Diesel Generator Not Completed Within Required Time Limit. (Section O8.2)

**Closed**

- 50-302/99-02-01 NCV Inadequate Battery Charger Tagout Results in Energized Equipment Approved for Maintenance. (Section O4.2)
- 50-302/99-02-02 NCV Diesel Generator Technical Specification Applicability Not Recognized. (Section O8.1)
- 50-302/99-02-03 NCV Surveillance for Inoperable Emergency Diesel Generator Not Completed Within Required Time Limit. (Section O8.2)
- 50-302/98-10-00 LER Required Actions of Improved Technical Specifications Were Not Recognized as Applicable Due to Personnel Error. (Section O8.1)
- 50-302/98-12-00 LER Personnel Error Causes Delay in Performance of Improved Technical Specifications Required Actions. (Section O8.2)
- 50-302/97-14-13 VIO Failure to Take Adequate Corrective Actions to Identify and Correct the Design Weaknesses Associated with Adequacy of the Past 10 CFR 50.59 Review for Positioning of DHV-34 and DHV-35 During Normal Operation. (Section E8.1)
- 50-302/99-02-00 LER Contaminated Clothing Leads to Exceedance of a Radiological Dose Rate Limit of 10 CFR 20.1301(a)(2). (Section R8.1)
- 50-302/98-11-03 IFI Adequacy of Freeze Protection for the BWST Level Transmitters. (Section E8.2)
- 50-302/97-16-03 VIO Failure to Design and Install Radioactive Waste Disposal System Piping as Described in FSAR. (Section O8.3)
- 50-302/98-03-01 VIO Failure to Meet Surveillance Requirements for Axial Power Imbalance. (Section O8.3)
- 50-302/98-10-01 VIO Valve Surveillance Requirements to Lock or Secure in Position or Routinely Verify Were Not Completed. (Section O8.3)