



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

Report No.: 50-302/94-12

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: May 16 - 20, 1994

Inspector: S. Rudisail  
S. Rudisail

6/17/94  
Date Signed

Approved by: M. Shymlock  
M. Shymlock, Chief  
Plant Systems Section  
Engineering Branch  
Division of Reactor Safety

6-17-94  
Date Signed

### SUMMARY

#### Scope:

This routine, announced inspection was conducted in the areas of cable separation to determine the adequacy of the corrective actions for violation 50-302/91-01-02.

#### Results:

In the areas inspected an Unresolved Item (URI) was identified. Post Maintenance Testing had been signed off in a work package as verified and complete but had not been performed at the time the signature was made. This was identified as URI 94-12-01, Verification Process for Post Maintenance Testing.

A weakness was identified during a walkdown. The Crystal River Separation Criteria requires color coding of conduits to maintain separation. During the walkdown, flexible conduit which had been installed to correct previously identified separation deficiencies was observed as not having the required color coding. This work had been inspected and Quality Control verified without this deficiency being identified. The work package had not been closed at the time of the walkdown. The final engineering evaluation signoff to ensure separation criteria had been met for this work was pending at the time of this inspection.

All modification work for this outage to correct separation deficiencies had been completed. The modifications met the requirements of the Crystal River separation criteria. The modification packages were complete and the instructions adequate.

Walkdowns were being performed for the preparation of the remaining modification work to be completed before or during the next refueling outage. The commitment date for the completion of this corrective action was on schedule.

Violation 50-302/91-01-02, Adequacy of Cable Separation was closed.

## REPORT DETAILS

### 1. Persons Contacted

#### Licensee Employees

- F. Bailey, Head, Electrical Shop
- \*D. Bates, Supervisor, Nuclear Quality Control
- \*S. Burns, Site Representative Engineer
- \*R. Davis, Manager, Nuclear Plant Maintenance
- \*P. Ellsberry, Nuclear Technical Training Supervisor
- \*P. Genoa, Nuclear Support Specialist
- \*J. Maseda, Manager, Nuclear Operations
- \*B. McLaughlin, Nuclear Regulatory Specialist
- \*P. Rubio, Principal, Electrical Engineer
- \*K. Wilson, Manager Nuclear Licensing
- \*R. Yost, Supervisor, Quality Systems

Other licensee employees contacted during this inspection included craftsmen, engineers, technicians, and administrative personnel.

#### Other NRC employees:

- \*R. Butcher, Sr. Resident Inspector
- \*T. Cooper, Resident Inspector
- \*B. Parker, Radiation Specialist
- \*F. Wright, Sr. Radiation Specialist

\*Attended exit interview

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

### 2. Review of Corrective Actions for Violation 50-302/91-01-02, Adequacy of Cable Separation (IP 92702)

#### a. Background

During the Maintenance Team Inspection documented in NRC Inspection Report 50-302/91-01, a violation was identified for failure to maintain cable separation requirements. This violation was identified as Violation 50-302/91-01-02, Adequacy of Cable Separation. This violation identified several examples where different safety trains had cable which did not meet the requirements for separation distance. Cables trays were identified with cable hanging outside their assigned cable trays, missing cable tray covers were identified, and other deficiencies were identified in cable routing requirements.

The corrective action for this violation consisted of engineering and craft personnel performing walkdowns of the plant electrical systems to identify the extent of the problem, the root causes and the appropriate corrective action.

As a result of the walkdowns and drawing reviews approximately 2500 instances of deviations from the cable separation requirements were identified. Approximately 1500 deficiencies were identified in the field during the walkdowns and an approximate 1000 other deficiencies were identified during a review of the electrical cabinet drawings. Due to the extent of the deficiencies a Corrective Action Program was initiated for Problem Report PR-91-0005. A case number was assigned to each deficiency for tracking and resolution.

The root cause of the violations was determined as circuit routing and raceway penetrations not in agreement with design documents, six inch separation distance between redundant channels was not met, maintenance procedures did not reflect the design criteria, and separation guidelines for other than redundant channels had not been documented. Design document reviews showed that proposed tray routings were consistent with separation criteria guidelines but the separation guideline implementation was absent during installation.

The separation criteria at Crystal River was re-constituted and enhanced to more clearly define what criteria had been used by the plant for construction and licensing. The separation criteria used information from other utility and industry test reports. The separation criteria was revised to address conduit to conduit separation, conduit to cable tray separation, 1E to non-1E separation and use of fire wrap to obtain separation compliance. The reconstituted and revised separation criteria was used to disposition discrepancies identified during the walkdowns.

b. Review of Modification Packages

The inspector reviewed the modification packages which had been completed during the refueling outage (RFO 9). Three modification packages were completed during this time.

Modification Action Request (MAR) 91-08-26-01, Separation Discrepancies in the Main Control Board was completed to correct separation deviations within the Main Control Board (MCB) of the Control Room. This modification installed or modified separation barriers and relocated devices and wires to comply with the Electrical Design Criteria, Electrical Circuit Physical Separation and Cable Tray Loading. The modifications addressed by this MAR are in the Engineered Safety Features, Integrated Control System, Plant Status Alarm, and Heating Ventilation Control sections of the MCB.

MAR 91-08-26-02, Resolution of Separation Discrepancies External to Enclosures was issued to modify cable and raceway installations to bring them into compliance with the electrical separation criteria. This modification physically relocates circuits to maintain the required separation criteria between IE to IE and IE to non-IE raceways and circuits or installed barriers to achieve separation.

MAR 91-08-26-03, Separation Discrepancies in Relay Rack 5B1 and Remote Shutdown Panel B was completed to correct separation deviations within the relay rack and remote shutdown panel. Corrective action to resolve the separation discrepancies consisted of installation of separation barriers or modification of existing barriers and relocation of devices and wires.

The modification packages were complete with adequate instruction and detail for the installation of the separation barriers. Appropriate drawings, procedures, and instructions were contained or referenced in the modification packages. The inspector reviewed the design and safety reviews for the modification packages. The reviews were complete and the conclusions satisfactory.

c. Walkdown of Modified Cabinets and Panels

The inspector reviewed corrective actions which had been performed with work requests. These corrective actions were simple modifications such as installation of flex conduit on cable and wires. These actions were completed prior to and during RFO 9. During a review of work request 0298383, the inspector reviewed the Post Maintenance Testing (PMT) results. The PMT had been signed off as performed and verified on April 18, 1994, in the work request package. The PMT had been performed during the period of April 28 through May 5, 1994. Surveillance Procedure SP-193A, EFIC Transmitters Channel Calibration During Modes 4 through 6 was used as the PMT for this work request package. The signoff and verification of PMT completion prior to the actual performance is identified as Unresolved Item 94-12-01, Verification Process for Post Maintenance Testing. This item will be unresolved until further NRC review of the PMT signature certification process.

During a walkdown of the Remote Shutdown Panel, Section A, it was noted by the inspector that the color coding had not been installed on the flexible conduit installed in the panel to meet separation requirements. Color coding of the flexible conduit was required by the separation criteria, Electrical Design Criteria, Electrical Circuit Physical Separation and Cable Tray Loading and Maintenance Procedure MP-405A, Handling, Pulling and Terminations for Safety and Non-safety Related Cables. The inspector reviewed the work request forms used for completion of this work. Work Request 0298383 was the package utilized to install the flex

conduit in the Remote Shutdown Panel A. Although the work package had not received a final closure signature and engineering evaluation, the work package had received the Chief Electrician signature for verification of field work. Also, Quality Control verification had been performed on the work without either check identifying the failure to meet the requirements for color coding as stated in the separation criteria guidelines and the maintenance procedure MP 405A. The failure to install the color coding in accordance with the separation requirements criteria was identified as a weakness in the understanding of the color coding requirements of the separation criteria by the craftsmen performing the work.

Other work packages were reviewed and walkdowns performed to ensure that this problem had not been recurrent. Also, walkdowns were performed of other areas that had separation deficiency correction work performed. These walkdown reviews did not identify any other weaknesses in the installation work.

A walkdown inspection was performed of the panels and cabinets modified by MAR 91-08-26-01, 91-08-26-02, and 91-08-26-03. The inspector verified that the work performed within the cabinets and panels affected by the MARs had been performed in accordance with the appropriate instructions and met the requirements of the separation criteria.

d. Engineering Evaluations

Of the 1500 discrepancies identified in the field during walkdowns approximately 600 were dispositioned by the issue of Revision 1 of the Electrical Design Criteria, Electrical Circuit Physical Separation and Cable Tray Loading. Approximately 450 cases remain to be evaluated. One hundred forty two cases remain to be dispositioned by MAR 91-08-26-04. These will be corrected before or during the next RFO. Other cases have been dispositioned by engineering evaluation determination that the condition is acceptable and no modification is required. As required by the separation criteria these cases are documented in Calculation E-93-0019, Separation Criteria Exceptions. This calculation contained 39 separate exception evaluations at the conclusion of this inspection. These exceptions are detailed evaluations to justify not meeting separation guideline requirements when they are determined to be physically impractical or unduly restrictive.

Due to the number of these evaluations, the scope of each evaluation, and the level of detail, the inspector determined these items should be reviewed during a future inspection.

## e. Conclusion

The inspector concluded that the corrective actions performed in response to Violation 50-302/91-01-02 met the requirements of the Crystal River separation criteria. The status of the remaining corrective actions were on schedule for satisfying the NRC commitment date of July 1996 for completion of all corrective actions in response to this violation. The inspector concluded that the progress of the pending corrective actions and the satisfactory completion of other corrective actions were adequate for closure of this violation. Violation 50-302/91-01-02, Adequacy of Cable Separation was closed.

## 3. Exit Meeting (IP 30703)

The inspection scope and results were summarized on May 20, 1994, with those individuals indicated in paragraph 1. The inspector described the areas inspected and discussed in detail the inspection findings. There were no dissenting comments received from the licensee. Proprietary information is not contained in this report.

(Open) Unresolved Item 50-302/94-12-01, Verification Process for Post Maintenance Testing

(Close) Violation 50-302/91-01-02, Adequacy of Cable Separation

## 4. Abbreviations and Acronyms

EFIC	Emergency Fill Initiation Control
IP	Inspection Procedure
MAR	Modification Action Request
MCB	Main Control Board
NRC	Nuclear Regulatory Commission
PMT	Post Maintenance Testing
RFO	Refueling Outage
SSOD	Shift Supervisor on Duty
URI	Unresolved Item