

**Florida
Power**
CORPORATION

Crystal River Unit 3
Docket No. 50-302

October 17, 1990
3F1090-03

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

Subject: Electrical System Improvements

- Reference:
- A. FPC to NRC letter dated August 14, 1989, Management Review of Significant Current Issues
 - B. FPC to NRC letter dated May 18, 1990, EQ Enhancement Program Program Status
 - C. FPC to NRC letter dated October 20, 1989, Electrical Enhancement Plan
 - D. FPC to NRC letter dated July 18, 1990, EDG Voltage Dips

Dear Sir:

Florida Power Corporation (FPC) recently completed a refueling outage at Crystal River Unit 3 (CR-3) during which several significant improvements were made in the electrical systems. The purpose of this letter is to describe the improvements achieved and the plans for continued reviews and modifications. Progress is continuing on the environmental qualification enhancement program, electrical calculation enhancements and related portions of the configuration management program. This provides an integrated update on the electrical support systems activities described in attachments and enclosures to References A through C, above.

DIESEL AND RELATED MODIFICATIONS

The emergency diesel generators have been modified to increase reliability, increase capacity, and reduce voltage dips. In addition a modification was installed to reduce projected emergency loading. These modifications included:

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- (a) Replacement of several diesel generator components with more reliable, currently supplied equipment;
- (b) Expansion of lube oil cooling capacity;
- (c) Realigning block load sequences to better balance transient loading on the diesels; and
- (d) Addition of the trip/block modification on low pressure injection and emergency feedwater pumps to lower the projected worst case load and avoid unnecessary prolonged operation of the low pressure injection pumps at low flow.

Following completion of the modifications, the diesels were thoroughly tested by a comprehensive program developed based on the manufacturer's recommendations, Technical Specifications, and industry practice. As a part of that testing program, voltage dips were measured during the block loading following a simulated loss of coolant accident and simultaneous loss of off-site power. Some voltage dips measured exceeded the values recommended in Regulatory Guide 1.9. This condition was reported previously in Reference D and discussed in detail with the NRC staff in a meeting on July 24, 1990. The condition possibly resulted from a slow voltage regulator response and/or a shorter than specified time delay between load blocks. FPC is preparing to perform a testing program to adjust the voltage regulator dynamic response. This testing will be performed during the mid-cycle outage currently scheduled for the Fall of 1991. Strategies for performing the testing and making the voltage regulator adjustments are being evaluated. Plans currently call for multiple small adjustments to the voltage regulator stability adjustment followed by a response test consisting of the simultaneous starting of several large motors. This methodology will be used to optimize the response time of the voltage regulator.

FPC is attempting to correct the problem with the block loading timing by replacing the block loading time delay relays. FPC is in the process of contacting various relay manufacturers to find more accurate relays which can be delivered on a schedule to support installation during the mid-cycle outage.

FPC will add a diesel monitoring system to significantly expand the amount of performance data available for reliability centered maintenance activities. Current plans are to include installation of this system in the mid-cycle outage scheduled for the Fall of 1991.

STARTUP TRANSFORMERS

A new off-site power transformer was installed. The transformer replaces the feed from the Crystal River Units 1 & 2 startup transformer. This new transformer is now the normal source for the engineered safeguards buses instead of the Crystal River 3 (CR-3) startup transformer. This change has eliminated voltage swings on the engineered safeguards buses which caused actuations of the second level undervoltage relays in the past.

The transformer utilized in this installation was the site spare startup transformer. It was utilized because it was readily available and allowed the project to proceed on a more expeditious schedule. FPC is currently planning to replace this transformer with one specifically designed for this application in the mid-cycle outage scheduled for the Fall of 1991.

BATTERIES

Both safety related battery banks have been replaced with new cells of a slightly larger capacity. The previous batteries were approaching the end of life. FPC will also install a non-safety related battery to power non-safety related loads. This will reduce the operating staff's burden in a station blackout, by providing additional margin, which reduces the need for complex coping strategies. The modification had been scheduled for installation during the next refueling outage in Fall, 1992. However, an effort is underway to expedite the project so that the installation may possibly be completed during the mid-cycle outage during the Fall of 1991.

STATION BLACKOUT

Several of the deficiencies identified by the NRC during the August 1989 visit have been resolved. A detailed response to the associated Safety Evaluation Report is being provided under separate cover.

- A. A reactor coolant inventory calculation, consistent with the NUMARC guidance, has been completed. The results of this calculation are being used to improve procedural guidance.
- B. Redesigned Byron Jackson reactor coolant pump seals have been installed on the four reactor coolant pumps. These seals have been laboratory tested under station blackout conditions with good results. This provides assurance that reactor coolant losses during a station blackout event would be minimal.
- C. A Diesel Generator Reliability Program which meets the intent of NUMARC 87-00, Appendix D, will be implemented before the end of November, 1990.
- D. FPC is taking positive steps to assure CR-3 remains a four hour coping duration plant without reliance on a hurricane shutdown requirement. FPC is adopting a target emergency diesel generator reliability of 0.975. This option was discussed with the NRC staff in the meeting that took place on August 31, 1989. This higher target reliability will be incorporated in the Emergency Diesel Generator Reliability Program being developed in accordance with NUMARC 87-00, Appendix D, and Regulatory Guide 1.155.
- E. The engineering study to provide the capability to operate the atmospheric dump valves during a station blackout is in progress. That modification is still scheduled to be installed during the Refuel 8 outage.

- F. FPC will add sufficient battery capacity to cope with a four hour station blackout event and maintain control of the plant from the main control room. The addition of the non-safety related battery described in the preceding section should allow this. Currently, the procedure requires operation from the remote shutdown panel. The instruments and controls included on the remote shutdown panel have been carefully designed and provide sufficient operating capability with sufficient information to monitor and control the plant systems in the hot standby mode. A study is currently in progress to determine the ability of the batteries to function for a four hour SBO event following the addition of the new non-safety related battery and the return of the main control room loads.

ENVIRONMENTAL QUALIFICATION (EQ)

The various phases of the Environmental Qualification Enhancement Program are proceeding as planned and as discussed in previous correspondence (References A and B). Also, work is continuing to permanently resolve the equipment qualification issues associated with high energy line breaks in the Intermediate Building.

The field verification to re-establish and document the qualified base-line configuration of the EQ equipment has been completed. The identified equipment deficiencies have been corrected and reported as supplements to LER 89-016. Other discrepancies which were identified during the walkdowns were resolved.

The Vendor Qualification Packages (VQP's) are being reorganized and supplemented so they are more easily used by all organizations. Maintaining the files and auditing the qualification of equipment will also be made more user friendly. The enhanced VQP's will be completed by November 15, 1990.

The enhanced EQML has been independently generated and issued in preliminary form. The final enhanced EQML will be integrated into the Configuration Management Information System by December 31, 1990.

As discussed previously, FPC will further enhance the EQ program by adopting a more conservative, radiation threshold criterion. This will result in additional equipment being added to the EQML. Field verification of this equipment has started and will be completed prior to the end of the mid-cycle outage scheduled for the Fall of 1991. The discrepancies which are identified are being documented and any modifications necessary will be completed prior to restart from the Refuel 8 outage, when the additional equipment will be formally added to the EQ program.

ELECTRICAL DESIGN REVIEW AND CALCULATION ENHANCEMENT PROGRAM

The various phases of the Electrical Calculation Enhancement Program are proceeding as planned and as discussed in previous correspondence (References B and C). FPC is proceeding with AC and DC calculations as described in our earlier correspondence. The AC effort is still scheduled to be completed by December 31, 1990. The DC effort has been delayed and is now scheduled to be completed in March, 1991.

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The coordination of AC and DC protective devices used at CR-3 is being reviewed to ensure they are properly applied for the intended service. This includes both continuous and overload conditions for both safety related and selected non-safety related equipment. The original scope of this effort is scheduled to be completed by December 31, 1990. In addition, the original scope has been expanded to include the 120 volt vital bus breaker and fuse sizing and voltage drop calculations. This additional work is projected to be completed by August 1, 1991.

The calculations for the diesel generators are being updated to reflect the modifications that were installed during Refuel 7 outage.

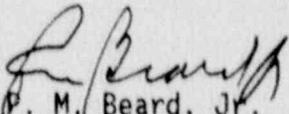
Field testing of emergency loads was completed during the Refuel 7 outage. The calculations will be updated to include the data gathered during that testing.

The Electrical System Design Basis Reconstitution Effort described in Enclosure 1 to Reference C has been completed and the field validation of the documents is now in progress. That work is approximately 70 percent complete.

CONCLUSION

FPC considers the progress made on these issues to have significantly improved the safety and reliability of CR-3. We will continue to focus resources on this area until the noted activities are completed.

Sincerely,


P. M. Beard, Jr.
Senior Vice President
Nuclear Operations

PMB:AEF

xc: Regional Administrator, Region II
Senior Resident Inspector