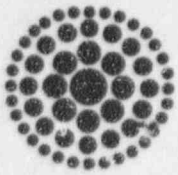

Florida Power

CORPORATION
Crystal River Unit 3
Docket No. 50-302

April 10, 1997
3F0497-11

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555-0001

Subject: Crystal River Nuclear Generating Plant Unit 3 10 CFR 50 Appendix R Design Basis for Remote Shutdown

References: A. NRC to FPC letter, 3N0397-10, dated March 10, 1997
B. FPC to NRC letter, 3F0894-02, dated August 15, 1994

Dear Sir:

In Reference A, Florida Power Corporation (FPC) received a request from the NRC to confirm the ability to meet its design basis for Appendix R requirements for alternate shutdown capability. The request was prompted by an apparent inconsistency between Appendix R requirements and statements made in Reference B, relating to GL 87-02, Verification of Seismic Adequacy of Mechanical and Electrical Equipment in Operating Reactors. In that letter, FPC stated that it was not possible, given a Loss of Off-Site Power, to cool down to a hot shutdown condition (280°F) within 72 hours following a design basis seismic event. The Appendix R design basis, as stated in the Final Safety Analysis Report, paragraph 7.4.6, Auxiliary Control Stations (Remote Shutdown Systems), requires alternate shutdown capability to achieve cold shutdown conditions within 72 hours as required by 10 CFR 50 Appendix R Section III.L.1. Cold Shutdown, as defined in the CR-3 Improved Technical Specifications, requires Reactor Coolant System (RCS) temperature to be less than 200°F.

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Following a Loss of Off-Site Power, with the RCS temperature above 280°F, decay heat is transferred from the core to the steam generators by natural circulation. Cooldown

occurs when steam is vented from the steam generators to the atmosphere using the Atmospheric Dump Valves (ADV). Below 280°F, decay heat is removed directly from the primary system by the Decay Heat Removal system. The question raised by the apparent inconsistency is the capability of the ADVs to quickly cool the RCS to the point where the Decay Heat Removal system can be placed into service. The two ADVs (one per steam generator) have a combined capacity of 5.4% of rated steam flow at rated pressure. As the plant is cooled and depressurized, the ADV capacity decreases, reducing the achievable cooldown rate.

The cause of the apparent inconsistency is a difference in the calculation inputs for decay heat generation. Calculations of the cooldown capability are sensitive to the inputs used, particularly the time dependent decay heat correlation. The conclusion reached in Reference B was based on FPC calculation F-86-0001, Revision 1. This calculation was performed in response to Generic Letter 81-21, Natural Circulation Cooldown, to calculate the feedwater inventory requirements necessary for a natural circulation cooldown. Inputs were conservatively chosen to maximize the feedwater requirements. The time dependent decay heat calculation was based on Branch Technical Position (BTP) ASB 9-2, Residual Decay Heat Release Rate for Light Water Reactors, for an infinitely irradiated core.

The results of FPC calculation F-86-0001, Revision 1, prompted calculation F-92-0003, Revision 0, to be performed to confirm that the 10 CFR 50 Appendix R, Section III.L licensing basis requirements could still be met. Inputs were chosen to calculate a minimum realistic cooldown time. The decay heat correlation was based on ANSI/ANS-5.1, Decay Heat Power in Light Water Reactors, and assumed a core irradiation of 3 cycles at 550 EFPD per cycle. The results of calculation F-92-0003, Revision 0 are that cooldown below 280°F can be achieved in approximately 49 hours. This would allow sufficient time to establish stable Hot Shutdown Conditions in the plant from the Remote Shutdown Panel prior to commencing the cooldown. There would be sufficient time, after cooling down to 280°F, to start the Decay Heat System and conduct a cooldown from 280 °F to 200 °F within the required 72 hours.

Calculation F-92-0003, Revision 0, has recently been reviewed. The review determined that the calculation allowed initial cooldown rates in excess of natural circulation cooldown limits. The effects of adjusting the cooldown rate to be consistent with the natural circulation cooldown limits adds approximately 5 hours to the overall cooldown time. This addition does not adversely affect the capability to achieve Cold Shutdown within the required 72 hours.

LER 96-022-00, Design Error Regarding Hot Shorts Results in Operation Outside 10CFR50 Appendix R Design Basis, identified a concern with components controlled from the Remote Shutdown Panel. In LER 96-022-01, FPC committed to additional

corrective action to perform a complete review of the post-fire safe shutdown analysis and to perform a design review of remote shutdown capability. This will include an examination and appropriate revision of AP-990, Shutdown from Outside Control Room, which is the procedure that implements the post-fire safe shutdown capability required by 10 CFR 50 Appendix R, Section III.L. Completion of these additional corrective actions will confirm that FPC can meet the design basis for Appendix R requirements for alternate shutdown capability. These additional corrective actions are being tracked as Restart Issue D-11.

Please contact W. L. Rossfeld at (352) 563-4374 if you have any questions concerning this submittal.

Sincerely,

John J. Holden
Director, Nuclear Engineering and Projects

JH/WJL:ff

Regional Administrator, Region II
Senior Resident Inspector
NRR Project Manager