March 9, 1998

Mr. Roy A. Anderson
Senior Vice President
Nuclear Operations
Florida Power Corporation
ATTN: Manager, Nuclear Licensing
Crystal River Energy Complex (SA2A)
15760 W. Power Line Street
Crystal River, Florida 34428-6708

SUBJECT: CRYSTAL RIVER UNIT 3 - STAFF EVALUATION AND ISSUANCE OF AMENDMENT RE: REACTOR BUILDING FAN RECIRCULATION SYSTEM FAN COOLER STARTING LOGIC MODIFICATION (TAC NO. MA0250)

Dear Mr. Anderson:

The Commission has issued the enclosed Amendment No.165 to Facility Operating License No. DPR-72 for the Crystal River Unit 3. This amendment is in response to your request dated December 5, 1997, in which you proposed to revise the Final Safety Analysis Report (FSAR) and the Improved Technical Specification Bases to reflect the modified reactor building fan recirculation system fan cooler starting logic. You also provided additional information by letters dated December 11, 1997, January 9, February 12 and 19, 1998, which did not affect the original no significant hazards determination.

The amendment approves changes to the FSAR, and requires that the changes be submitted with the next update of the FSAR pursuant to 10 CFR 50.71(e). A copy of the related Safety Evaluation is enclosed. The Notice of Issuance will be included in the Commission's biweekly Federal Register notice.

Sincerely,

ORIGINAL SIGNED BY:

L. Wiens, Senior Project Manager
Project Directorate II-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket No. 50-302
Enclosures: 1. Amendment No. to DPR-72
2. Safety Evaluation
cc w/enclosures: See next page

Distribution:
Docket File
PUBLIC
CR-3 r/f
ACRS
TMarsh
CBerlinger
GWermiel
JZwolinski
THarris (EMail SE)
BClayton
LWiens
OGC
FHebdon
LPlisco, RII
WLeFave
GHill (2)
WBeckner

DF01

OFFICE	PDII-3/PM	PDII-3/LA	SPLB/BC	SCSB/BC	HICB/BC	OGC	PDII-3/D
NAME	LRaghavan:cw	BClayton	TMarsh	CBerlinger	JWermiel	CMunro	FHebdon
DATE	2/23/98 3/3/98	2/20/98 3/3/98	2/24/98	2/26/98	2/26/98	3/3/98	3/9/98

OFFICIAL RECORD COPY DOCUMENT NAME: G:\CRYSTAL\MA0250.AMD

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

March 9, 1998

Mr. Roy A. Anderson
Senior Vice President
Nuclear Operations
Florida Power Corporation
ATTN: Manager, Nuclear Licensing
Crystal River Energy Complex (SA2A)
15760 W. Power Line Street
Crystal River, Florida 34428-6708

SUBJECT: CRYSTAL RIVER UNIT 3 - STAFF EVALUATION AND ISSUANCE OF AMENDMENT RE: REACTOR BUILDING FAN RECIRCULATION SYSTEM FAN COOLER STARTING LOGIC MODIFICATION (TAC NO. MA0250)

Dear Mr. Anderson:

The Commission has issued the enclosed Amendment No. 165 to Facility Operating License No. DPR-72 for the Crystal River Unit 3. This amendment is in response to your request dated December 5, 1997, in which you proposed to revise the Final Safety Analysis Report (FSAR) and the Improved Technical Specification Bases to reflect the modified reactor building fan recirculation system fan cooler starting logic. You also provided additional information by letters dated December 11, 1997, January 9, February 12 and 19, 1998, which did not affect the original no significant hazards determination.

The amendment approves changes to the FSAR, and requires that the changes be submitted with the next update of the FSAR pursuant to 10 CFR 50.71(e). A copy of the related Safety Evaluation is enclosed. The Notice of Issuance will be included in the Commission's biweekly Federal Register notice.

Sincerely,

Frederick J. Hebdon

FOR L. Wiens, Senior Project Manager
Project Directorate II-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket No. 50-302

Enclosures: 1. Amendment No. 165 to DPR-72
2. Safety Evaluation

cc w/enclosures: See next page

Mr. Roy A. Anderson
Florida Power Corporation

cc:
Mr. R. Alexander Glenn
Corporate Counsel
Florida Power Corporation
MAC-A5A
P.O. Box 14042
St. Petersburg, Florida 33733-4042

Mr. Charles G. Pardee, Director
Nuclear Plant Operations (NA2C)
Florida Power Corporation
Crystal River Energy Complex
15760 W. Power Line Street
Crystal River, Florida 34428-6708

Mr. Bruce J. Hickle, Director
Director, Restart (NA2C)
Florida Power Corporation
Crystal River Energy Complex
15760 W. Power Line Street
Crystal River, Florida 34428-6708

Mr. Robert B. Borsum
Framatome Technologies Inc.
1700 Rockville Pike, Suite 525
Rockville, Maryland 20852

Mr. Bill Passetti
Office of Radiation Control
Department of Health and
Rehabilitative Services
1317 Winewood Blvd.
Tallahassee, Florida 32399-0700

Attorney General
Department of Legal Affairs
The Capitol
Tallahassee, Florida 32304

Mr. Joe Myers, Director
Division of Emergency Preparedness
Department of Community Affairs
2740 Centerview Drive
Tallahassee, Florida 32399-2100

Chairman
Board of County Commissioners
Citrus County
110 North Apopka Avenue
Inverness, Florida 34450-4245

Mr. Robert E. Grazio, Director
Nuclear Regulatory Affairs (SA2A)
Florida Power Corporation
Crystal River Energy Complex
15760 W. Power Line Street
Crystal River, Florida 34428-6708

Senior Resident Inspector
Crystal River Unit 3
U.S. Nuclear Regulatory Commission
6745 N. Tallahassee Road
Crystal River, Florida 34428

Mr. John P. Cowan
Vice President, Nuclear Production
(NA2E)
Florida Power Corporation
Crystal River Energy Complex
15760 W. Power Line Street
Crystal River, Florida 34428-6708

Mr. James S. Baumstark
Director, Quality Programs (SA2C)
Florida Power Corporation
Crystal River Energy Complex
15760 W. Power Line Street
Crystal River, Florida 34428-6708

Regional Administrator, Region II
U.S. Nuclear Regulatory Commission
61 Forsyth Street, SW., Suite 23T85
Atlanta, GA 30303-3415

Mr. Kerry Landis
U.S. Nuclear Regulatory Commission
61 Forsyth Street, SW., Suite 23T85
Atlanta, GA 30303-3415

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

FLORIDA POWER CORPORATION
CITY OF ALACHUA
CITY OF BUSHNELL
CITY OF GAINESVILLE
CITY OF KISSIMMEE
CITY OF LEESBURG
CITY OF NEW SMYRNA BEACH AND UTILITIES COMMISSION,
CITY OF NEW SMYRNA BEACH
CITY OF OCALA
ORLANDO UTILITIES COMMISSION AND CITY OF ORLANDO
SEMINOLE ELECTRIC COOPERATIVE, INC.
CITY OF TALLAHASSEE

DOCKET NO. 50-302

CRYSTAL RIVER UNIT 3 NUCLEAR GENERATING PLANT

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 165
License No. DPR-72

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Florida Power Corporation, et al. (the licensees) dated December 5, 1997 as supplemented December 11, 1997, January 9, Febraury 12 and Febraury 19, 1998, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, changes to the updated Final Safety Analysis Report (FSAR) to reflect changes to the Reactor Building Cooling Fan logic at Crystal River Unit 3, as set forth in the application for amendment by Florida Power Corporation dated December 5, 1997 as supplemented December 11, 1997, January 9, February 12 and 19, 1998, are authorized. The licensee shall submit the revised description authorized by this amendment with the next update of the FSAR in accordance with 10 CFR 50.71(e).

3. This license amendment is effective as of its date of issuance and shall be implemented as specified in (2), above.

FOR THE NUCLEAR REGULATORY COMMISSION

Frederick J. Hebdon

Frederick J. Hebdon, Director
Project Directorate II-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Date of Issuance: March 9, 1998

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

CONCERNING TECHNICAL SPECIFICATION BASES CHANGES REGARDING

THE REACTOR BUILDING RECIRCULATION SYSTEM FAN COOLER SYSTEM

FLORIDA POWER CORPORATION

CRYSTAL RIVER UNIT 3

DOCKET NO. 50-302

1.0 INTRODUCTION

By letter dated December 5, 1997, Florida Power Corporation (FPC or the licensee) submitted License Amendment Request 224 (LAR-224) which proposed an amendment to Operating License No. DPR-72 for Crystal River Unit 3 (CR3) to change the description of the design basis of the reactor building recirculation system fan cooler (RBFC) starting logic in the Final Safety Analysis Report. FPC also provided additional information by letters dated December 11, 1997, and January 9, February 12 and 19, 1998, which did not affect the original no significant hazards determination.

The licensee determined that, pursuant to 10 CFR 50.59, the proposed changes would constitute an Unreviewed Safety Question (USQ) and thus require the U.S. Nuclear Regulatory Commission (NRC or the staff) approval prior to implementation. The proposed changes would allow implementation of a modification to the RBFC motor starting logic to insure that only one of the three fan coolers would automatically operate upon initiation of an Reactor Building Isolation and Cooling (RBIC) signal. The purpose of this modification is to preclude overheating of the Service Water (SW) System.

2.0 EVALUATION

2.1 CR3 Post Accident Containment Cooling

In the event of a loss-of-coolant-accident (LOCA), containment cooling is required for containment heat removal and depressurization. Post accident containment heat removal capability at CR3 is provided by two systems: the containment spray (CS) system and the RBFC system. The RBFC system has three fan coolers, two of which are assigned to redundant trains and the third serves as a swing backup. A common SW System serves all three fan coolers and other vital post-accident heat removal loads. With the current configuration of fan cooler controls, two fan coolers (A and B) are automatically sequenced to start at slow speed upon receipt of an RBIC initiation signal. (High speed would overload the fan motors under LOCA conditions.) The licensee has determined that operation with more than one fan cooler following a LOCA could result in SW temperatures exceeding design limits if the RBFCs are clean and the ultimate heat sink (UHS) temperature is above approximately 80 degrees Fahrenheit (80°F). Exceeding the SW design temperature limit could potentially affect other safety-related equipment cooled by the SW system. With only one RBFC operating following a LOCA, SW temperature will not exceed its design limit (110°F) up to the UHS technical specification limit of 95°F. Therefore, the licensee proposed changes to the RBFC start logic to preclude more than one RBFC operating following a LOCA.

2.2 Proposed Modification

The proposed modification would allow only one, the "lead" fan cooler to automatically start on an accident signal. The operating status of the lead RBFC determines whether to start the backup RBFC. The standby fan cooler motor would start only if the slow speed contactor for the lead fan failed to close and restart of the lead RBFC is prevented. Either Fan Cooler A or Fan Cooler B would be able to serve as the lead fan cooler. The operating cooler, in conjunction with one operating spray system, then would provide sufficient containment heat removal capability without overheating of the SW System, for UHS temperatures up to 95°F.

No changes have been proposed to the nuclear services closed cycle cooling water (SW or service water) system, which supplies cooling water to the RBFCs. SW cooling water will still be supplied to two RBFCs following a LOCA but only one of the RBFC fans will be operating to transfer heat to the SW system.

3.0 EVALUATION

The SW system is a closed loop system consisting of two 100% capacity pumps that discharge to a common supply header and take suction from a common return header. A single surge tank assures net positive suction head for the pumps and acts as an expansion tank for temperature changes in the system. The SW system transfers its heat to the UHS via the nuclear services seawater (RW or raw water) system which interfaces with the SW system through three heat exchangers (plus a forth installed spare) connected in parallel in the SW return header. There is a normally closed single isolation valve in the SW supply header and a normally closed single isolation valve in the SW return header (upstream of the heat exchangers). These isolation valves are air-operated and are designed to fail closed on loss of power. These valves are energized with redundant Class IE solenoids which are powered from different battery backed sources to preclude a single electrical failure resulting in valve closure. Following a LOCA, these valves are relied upon to open to provide service water flow to the RBFCs.

The three RBFCs are connected to the SW system between the two SW header isolation valves such that SW is isolated to and from the fan coolers during normal operation. During normal operation, cooling water flow to the RBFC cooling coils is provided by the industrial cooling (IC) system which connects to the isolated SW supply and return headers (downstream of the supply isolation valve and upstream of the return isolation valve). In the event of a LOCA, the IC system is automatically isolated from the SW system and the SW header isolation valves automatically open to provide SW flow to and from the two normally operating Coolers A and B. The third (Cooler C) RBFC is normally isolated from the SW system via manual valves, and is used as a replacement fan cooler whenever either of the other RBFCs is taken out of service. Each RBFC also has a normally open, air-operated valve in its supply and return headers. Closure of either one of these valves would prevent cooling water flow (IC during normal operation and SW during post-LOCA operation) to its respective cooler. These normally open valves are designed to fail open on loss of power to its solenoid and will fail as-is on loss of air.

The USQ identified by the licensee lies in the fact that the proposed modification will result in an increase in the number of single-failure scenarios in the SW System that could cause loss of both fan coolers.

As discussed above, the proposed modification would allow only one, the "lead" fan cooler to automatically start on an accident signal. The standby fan cooler motor would start only if the slow speed contactor for the lead fan failed to close and restart of the lead RBFC is prevented. Either the A or B RBFC can be selected as the lead RBFC with the other as the backup RBFC. The C RBFC can be substituted for either the A or B RBFC as the lead or the backup RBFC. The operation of the C RBFC circuit is the same as the RBFC for which it is substituted. The circuitry includes relays to allow manual start of a second RBFC after the RBIC signal has been reset. The RBFC performance is dependent upon the proper operation of relays and relay contacts that have been added to provide the new actuation logic. The new logic has slightly increased the probability that the RBFC system would fail to perform its safety function. There is the potential that a single failure would prevent the operation of the RBFC system. This failure, however, is bounded by the licensee's previous analysis performed to evaluate failure of the SW system to provide cooling water to the RBFCs. The Staff has previously found this analysis acceptable because reactor building cooling can be accomplished by the use of both trains of the reactor building spray system.

Presently, there are two header isolation valves in the SW System, the failure of either of which, would disable both fan coolers. The proposed modification would add the supply and return valves for the operating RBFC, the failure of which could result in failure of the RBFC system. As a result, there may be an increase in the probability of malfunctions or failure of the RBFCs to effectively remove heat from the containment. This decrease in fan cooling system reliability constitutes a USQ.

The staff acknowledges the decrease in fan cooling reliability as a USQ and finds that it is acceptable because the facility design basis already encompasses and accommodates total failure of fan cooler capability. Should both the lead and standby fan coolers fail to provide containment heat removal, the CS system would still be available and capable of performing the containment post accident heat removal safety function without overheating of the SW System, for UHS temperatures up to 95°F. The CS system trains are not served by the SW System.

The existing containment pressure and temperature response to a LOCA assumes that containment cooling is initiated at 25 seconds using one (50%) fan cooler and one (50%) spray train. Since the cooling effect of one fan cooler is equivalent to that of one spray train, the containment post-LOCA pressure and temperature responses with loss of all fan coolers (leaving two trains of spray) is bounded by the existing analysis. Therefore, the staff concludes that the proposed modification is acceptable with respect to post accident containment heat removal.

The proposed modification does not affect the SW supply or return valves and does not increase the probability of occurrence of the malfunction of these valves. These failures do not affect the containment spray system such that 100% containment post-LOCA cooling would still be available via both trains of the containment spray system. However, there are certain other unlikely failure modes in the SW system and in the lead fan unit that would not be detected by the system logic that starts the backup fan. These failure modes include a mechanical type failure of the fan such as bearing seizure or shaft failure so that the motor runs but the fan blades do not rotate. SW system failures that result in loss of cooling flow to the lead RBFC would also not be detected by the circuitry that is intended to start the backup fan when the lead RBFC is not functioning. Loss of SW flow to only the lead RBFC could occur (a pipe break anywhere in the system would affect both fan units because of the closed system design) with the closure of the inlet or outlet SW valve to the lead RBFC. However, the staff does not consider the closure of either of these valves to be a credible design basis single active failure following a LOCA because they are normally open, air-operated valves that fail open on loss of Class IE power to the solenoids and fail as-is on loss of air. An electrical short or human intervention would have to occur in order for these valves to be inadvertently closed. A mechanical type passive failure resulting in flow blockage, such as disc separation, would be detected during normal operation since the RBFCs are normally in operation. Even if a flow blockage to the lead RBFC were assumed to occur (such as a closed inlet or outlet valve), the containment spray system would be unaffected by the failure and would still be available for 100% post-LOCA heat removal. Similarly, any failure modes that could result in loss of SW flow to both RBFCs, such as failure of the main supply or return header isolation

valve to open, would not affect containment spray system operation which would be available to provide design basis containment heat removal. The containment spray system is not dependent on the SW system or the RW system for any cooling support functions. Containment spray system component cooling water support is provided by the decay heat closed cycle cooling water (DC) system which transfers its heat to the UHS via the decay heat seawater system.

Based on this evaluation, the staff concludes that the proposed fan logic modifications are necessary to prevent exceeding SW system temperature limits under certain design basis conditions, and that the design of the SW system is acceptable from the standpoint of supporting the fan logic modifications because there are no credible single failures that result in less than 100% containment cooling capability following a design basis LOCA. For all credible failures either both trains of containment spray will be operating, or one RBFC and one train of containment spray will be operating to remove post-LOCA containment heat loads. Based on the above evaluation, the staff concludes that the proposed modification of the RBFC actuation logic continues to provide reasonable assurance that adequate containment cooling would be available when required. Therefore, the staff finds the proposed modification to be acceptable.

4.0 STATE CONSULTATION

Based upon written notice of the proposed amendment, the Florida State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATIONS

The amendment changes requirements with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that this amendment involves no significant hazards consideration and there has been no public comment on such finding (63 FR 2423). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

5.0 CONCLUSION

Based on its evaluation, the staff concludes that the proposed fan logic modifications are acceptable because there are no credible single failures that result in less than 100% containment cooling capability following a design basis LOCA. For all credible failures either both trains of containment spray will be operating, or one RBFC and one train of containment spray will be operating to remove post-LOCA containment heat loads. The staff, therefore, concludes that the licensee's proposed changes to FSAR and Bases sections of the plant technical specifications are acceptable.

Principal Contributors: W. LeFave, NDD/DE/SPLB
W. Long NRR/DSSA/SCSB
B. Marcus, NRR/HICB

Date: March 9, 1998