December 1, 1997

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

SUBJECT: CRYSTAL RIVER UNIT 3 - ISSUANCE OF AN AMENDMENT RE: EDG PROTECTIVE RELAYING SCHEME (TAC NO. M99580)

Dear Mr. Anderson:

The Commission has issued the enclosed Amendment No.159 to Facility Operating License No. DPR-72 for the Crystal River Unit 3 (CR3). The amendment is in response to your letter dated September 12, 1997, as supplemented November 7, 1997. The proposed amendment involves a revision to the Emergency Diesel Generator (EDG) protective relaying scheme at CR3, as described in the Final Safety Analysis Report (FSAR) Chapter 8. You determined that the proposed modifications constitute an unreviewed safety question (USQ) based on a resulting increase in the probability of a malfunction of equipment important to safety and, therefore, requested our approval before implementing the modification.

The amendment approves changes to the UFSAR, and requires that the changes be submitted with the next update of the UFSAR pursuant to 10 CFR 50.71(e). The enclosed associated Safety Evaluation contains the staff's review and findings, including the finding that the as-built condition of these protective devices is acceptable.

A Notice of Issuance will be included in the Commission's biweekly Federal Register notice.

Sincerely,
ORIGINAL SIGNED BY:
L. Raghavan, 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. 159 to DPR-72
2. Safety Evaluation



cc w/enclosures: See next page

DFO1

Distribution

| | | | |
|---|---|---|---|
| Docket File | F. Hebdon | G. Hill (2) | W. Beckner |
| PUBLIC | B. Clayton | M. Pratt | CR-3 r/f |
| L. Raghavan | ACRS | | J. Jaudon |
| B. Boger | OGC | T. Harris(E-Mail SE) | |

DOCUMENT NAME: G:\CRYSTAL\99580.AMD
To receive a copy of this document, indicate in the box: "C" = Copy without attachment/enclosure "E" = Copy with attachment/enclosure "N" = No copy

* See Previous

| OFFICE | PDII-3/PM | | PDII-3/LA | | OGC NLO, with comments | | PDII-3/D | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NAME | LRaghavan VR | | BClayton E1D | | RWeisman | | FHebdon * | | | | | |
| DATE | 11/28/97 | | 11/26/97 | | 11/28/97 | | 11/28/97 | | 11/ /97 | | 11/ /97 | |

OFFICIAL RECORD COPY

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

December 1, 1997

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

SUBJECT: CRYSTAL RIVER UNIT 3 - ISSUANCE OF AN AMENDMENT RE: EDG PROTECTIVE RELAYING SCHEME (TAC NO. M99580)

Dear Mr. Anderson:

The Commission has issued the enclosed Amendment No. 159 to Facility Operating License No. DPR-72 for the Crystal River Unit 3 (CR3). The amendment is in response to your letter dated September 12, 1997, as supplemented November 7, 1997. The proposed amendment involves a revision to the Emergency Diesel Generator (EDG) protective relaying scheme at CR3, as described in the Final Safety Analysis Report (FSAR) Chapter 8. You determined that the proposed modifications constitute an unreviewed safety question (USQ) based on a resulting increase in the probability of a malfunction of equipment important to safety and, therefore, requested our approval before implementing the modification.

The amendment approves changes to the UFSAR, and requires that the changes be submitted with the next update of the UFSAR pursuant to 10 CFR 50.71(e). The enclosed associated Safety Evaluation contains the staff's review and findings, including the finding that the as-built condition of these protective devices is acceptable.

A Notice of Issuance will be included in the Commission's biweekly Federal Register notice.

Sincerely,

L. Raghavan, 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. 159 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. 159
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 September 12, 1997, as supplemented November 7, 1997, 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, the license is hereby amended to authorize revision of the Updated Final Safety Analysis Report (UFSAR) as set forth in the application for amendment by Florida Power Corporation dated September 12, 1997, as supplemented November 7, 1997. The licensee shall submit the revised description authorized by this amendment with the next update of the UFSAR in accordance with 10 CFR 50.71(e).

3. This license amendment is effective as of its date of issuance and shall be implemented within 30 days.

FOR THE NUCLEAR REGULATORY COMMISSION

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

Date of Issuance: December 1, 1997

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

# SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

## PROPOSED FINAL SAFETY ANALYSIS REPORT CHANGES

## AMENDMENT NO. 159 TO FACILITY OPERATING LICENSE NO. DPR-72

## FLORIDA POWER CORPORATION, ET AL.

## CRYSTAL RIVER UNIT NO. 3 NUCLEAR GENERATING PLANT

## DOCKET NO. 50-302

### 1.0 BACKGROUND

In NRC Inspection Report 50-302/97-09, dated July 14, 1997, the Nuclear Regulatory Commission (NRC or the staff) stated that the modifications made to the emergency diesel generator (EDG) relaying scheme during the implementation of Modification 80-09-13-01 constituted an Unreviewed Safety Question (USQ) and that the modifications should be reviewed and approved by the NRC. In its response dated August 11, 1997, Florida Power Corporation (FPC or the licensee) agreed that a USQ existed, and accordingly, by letter dated September 12, 1997, submitted proposed modifications to the EDG relaying scheme for NRC review and approval. By letter dated November 7, 1997, the licensee provided additional information which did not affect the original no significant hazards consideration (62 FR 51165, September 30, 1997).

Modification 80-09-13-01 involved adding protective relaying to each EDG and rewiring some of the existing relaying. The modifications were intended to add more fault protection for each EDG and improve the availability of the EDG after fault conditions. The licensee is proposing Modification 97-08-01-01 to revise the EDG relay scheme to add more complete EDG and 4160V ES bus protection. However, the benefit of preventing damage to the EDG also has created the negative impact of increasing the probability of a spurious operation of the added relays which could disable the on-site emergency AC source. The licensee is requesting a license amendment to reflect the changes to the EDG protective scheme at Crystal River Unit 3 (CR-3) in the next revision to the Final Safety Analysis Report (FSAR).

### 2.0 EVALUATION

The licensee determined that the pre-modification relay configuration at CR-3 had some protective relaying for the EDG. However, the pre-modification relay protection scheme did not provide sufficient protection for the EDG during fault or overcurrent conditions. This created the potential of damaging the EDG and affecting the EDG's availability for long-term accident mitigation. Modifications 80-09-13-01 and 97-08-01-01 add new relaying to each EDG and rewire some of the existing relay configurations to provide sufficient EDG relay protection at CR-3.

Completed Modification 80-09-13-01

Modification 80-09-13-01 added the following protective relaying for each EDG at CR-3:

Device-51V AC time overcurrent relays with voltage restraint was added. These relays protect the EDG from damage by tripping the EDG engine device-86 lock-out relay if a fault or prolonged overcurrent condition is detected. These relays provide new protection for 4160V ES bus phase-to-phase and three phase faults and backup protection to the device-87 generator differential relaying for faults in the EDG generator or in the power cables between the generator and EDG breaker. The voltage restraint feature of these relays prevents the EDG from tripping during overcurrent excursions resulting from block loading. The device-51V AC time overcurrent relays are electromechanical induction disk relays.

Device-32 directional power relays were added. These relays prevent an EDG from being overloaded when the EDG and 4160V ES bus are paralleled with the offsite power sources. This relay sends a trip signal to each of the three bus offsite power source breakers if the EDG is called upon to deliver real power greater than 3498 kW to the 4160V ES bus. There is one device-32 directional power relay for each EDG. The device-32 directional power relays are solid state and require DC power to operate.

This modification installed additional device-86B1 lock-out relays from two of three 4160V bus offsite power source breakers (230 kV switchyard) AC time overcurrent relaying (device-51B and device-51BN). The two new device-86B1 lock-out relays were installed on the 4160V ES bus enclosure for use after control was transferred to the Remote Shutdown Panel. The two new device-86B1 lock-out relays are only functional after control is transferred to the Remote Shutdown Panel. This circuit configuration maintains the function of the 4160V ES bus offsite power source breaker device-86B lock-out relay trips to the EDG engine device-86DG lock-out relay for Main Control Room or Remote Shutdown Panel operation.

Additionally, Modification 80-09-13-01 wired each of the three previously existing 4160V ES bus offsite power source breaker device-86B lock-out relays to the EDG engine device-86DG lock-out relays. This relaying prevents the EDG from running and attempting to energize the associated 4160V ES bus after the 4160V bus has been de-energized due to an overcurrent or fault condition. This modification also wired the previously existing device-64DG generator ground relay to the EDG engine device-86DG lock-out relay. The purpose of the device-64DG generator ground relay was to protect the EDG from a 4160V ES bus ground fault. Another reason Modification 80-09-13-01 moved the device-64DG generator ground relay to the EDG engine device-86DG lock-out relay was to act as a backup for the device-87DG generator differential relaying for a ground fault in the EDG generator or on the power cables between the EDG generator and the EDG breaker.

Proposed Modification 97-08-01-01

Modification 97-08-01-01 changes the relay scheme to add the following protective relaying for each of the EDGs at CR3:

Modification 97-08-01-01 is adding more complete protection for each EDG and 4160V ES bus by installing a new device-86 EDG breaker lock-out relay for each EDG. The device-86 EDG breaker lock-out relay trips and prevents subsequent closure of the EDG output breaker onto a bus during overcurrent or fault conditions. The previous modification would trip the EDG on these conditions but there was no relaying to keep the EDG from closing on the bus if the overcurrent condition still existed. The tripping of the new breaker device-86B will also initiate an alarm on the Main Control Board. A power available light will be located adjacent to the new EDG breaker device-86B to indicate that the lockout circuit has power available and is not actuated.

This modification will also return each EDG engine device-86DG lock-out relay circuits to the pre-modification 80-09-13-01 configuration by moving the overcurrent relaying from the EDG engine device-86 lock-out relay to the new device-86B EDG breaker lock-out relay. Returning some of the EDG relaying to the pre-modification configuration will reduce the potential number of times the EDG is shut down unnecessarily. The EDG will be allowed to operate in stand-by for fault or overcurrent conditions caused by a 4160V ES bus problem or for a false protective relay actuation. The 87DG relaying will still remain in place to shut down the EDG upon receipt of a differential relay signal. This is acceptable because the device-87DG differential relaying can be depended upon to protect the EDG and the associated cabling.

The device-51V AC time overcurrent relaying with voltage restraint and device 64DG generator ground relay will be wired to the new 86B relay. This configuration will trip the EDG output breaker on overcurrent or ground fault conditions. Additionally, device-46DG negative sequence relay will be moved from the EDG breaker trip circuit to the new EDG breaker device-86B lock-out relay. The device-46DG negative sequence relay is being connected to the new EDG breaker device-86B lock-out relay to prevent EDG output breaker cycling due to any unsymmetrical operating condition.

The two device-86B1 lock-out relays that were installed in Modification 80-09-13-01 for Remote Shutdown Panel operation will also be connected to the new EDG breaker device-86B lock-out relay. If a Main Control Room fire/Cable Spreading Room fire occurred shorting out the conductors to the device-86B lock-out relay, an operator verification action to reset the EDG breaker device-86 lock-out relay is required. This is considered acceptable since the new EDG breaker device-86B lock-out relay is located in the 4160V ES Switchgear Room with the associated Remote Shutdown Panel transfer switches. Therefore, the operator can take appropriate actions within a reasonable time. Additionally, the need to check/reset the EDG breaker device 86B lock-out will be a planned verification action per plant procedure AP-990 for a Main Control Room/Cable Spreading Room fire.

This modification will not change the operation of the device-32 directional power relaying which was installed by Modification 80-09-13-01.

## 3.0 SUMMARY

The pre-modification EDG protective relay configuration at CR-3 was determined by the licensee to be inadequate to protect the EDG and 4160V ES bus from fault or overcurrent conditions. Modification 80-09-13-10 and Modification 97-08-01-01 involved adding more protective relaying to each EDG and 4160V ES bus. Protecting the EDG and limiting the damage to the 4160V ES bus improves the probability of having the EDG and 4160V ES bus available given a fault or overcurrent condition.

The introduction of additional relay protection may increase the probability of a spurious relay operation impacting the availability of the EDG. However, historical protective relay operation at CR-3 has been demonstrated to be reliable and spurious relay operation has been rare. The staff concludes that the benefits of protecting the EDG and 4160V ES bus outweigh the slight increase in the probability of spurious relay operation. Therefore, the staff finds the modifications to the EDG and 4160V ES bus protection scheme at CR-3 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 CONSIDERATION

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 (62 FR 51165). 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.

## 6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: Mark Pratt

Date: December 1, 1997