November 12, 1997

LICENSEE: Florida Power Corporation

PLANT: Crystal River Unit 3

SUBJECT: SUMMARY OF MEETING WITH THE FLORIDA POWER CORPORATION

On October 28, 1997, the Nuclear Regulatory Commission (NRC) staff met with representatives of the Florida Power Corporation (FPC) in Rockville, Maryland, to discuss the Emergency Diesel Generator (EDG) test plan and an amendment request involving the EDG protective relays. Enclosure 1 is a list of the meeting attendees and Enclosure 2 is a copy of the material distributed at the meeting. In the meeting, the NRC staff identified additional information that it needs to complete the review of the EDG protective relays amendment. Specifically, the staff requested the following:

1. Plant specific and industry experience, including failure data, with specific vintage of 51 V relays to confirm the reliability of the relays.
2. Documentation that the protective relays are in a surveillance program, and the specifics of the surveillance program.
3. A description of the type of indication (alarm) that is given to the operator when the output breaker opens.
4. The staff would also like confirmation that the diesel overspeed trip is not challenged when the output breaker opens.

FPC also made a presentation which clarified the EDG test plan. During the presentation FPC stated EDG-A is scheduled for 16 starts and 13 load runs with the new turbocharger, intercooler, and radiator installed. EDG- B is scheduled for 10 starts and 9 load runs with the new turbocharger, intercooler, and radiator installed. To date the licensee has completed 8 of the 13 runs on EDG-A and none on EDG-B. The staff requested that FPC commit to completing 22 (total for EDG-A & EDG-B) successful start and load run tests. The staff is continuing to evaluate the EDG test plan to determine if it is adequate to fully qualify the EDGs prior to restart. FPC requested that, by November 8, 1997, the staff approve the EDG protective relays amendment and the EDG Uprate Technical Specification amendment part of TSCRN 210 (subject amendment of the EDG test plan issue). The staff stated that it would not be possible to complete these reviews by that date given the outstanding questions that remain for these amendments. However, the staff did agree to provide some feedback as to the adequacy of the EDG test plan by November 8, 1997.

original signed by S.Flanders

Scott C. Flanders, Project Manager
Project Directorate PD II-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

DFO1

Docket No. 50-302

Enclosures: 1. Attendees List
2. Meeting Handout

cc w/enclosures: See next page
Document Name: G:\CRYSTAL\EDG.SUM

Office	PM:PDII-3	LA:PDII-3	PD:PDII-3		
Name	SFlanders	BClayton	FHebdon		
Date	11/12/97	11/13/97	11/13/97		
Copy	Yes/No	Yes	Yes/No		

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

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cc w/enclosures: See next page

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

Mr. Charles 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. 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. 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. 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

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

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M. Gameroni, EDO (MKG)
J. Calvo
J. Zwolinski
S. Saba
S. Flanders
M. Pratt

MEETING ATTENDEES

OCTOBER 28, 1997 MEETING

WITH FLORIDA POWER CORPORATION

NAME	ORGANIZATION
1. L. Raghavan	NRC/NRR
2. Jose Calvo	NRC/NRR
3. Fred Hebdon	NRC/NRR
4. John Zwolinski	NRC/NRR
5. Saba Saba	NRC/NRR
6. Scott Flanders	NRC/NRR
7. Mark Pratt	NRC/NRR
8. Carl Woodard	FPC/CR3
9. Jerry Campbell	FPC/CR3
10. Dave Kunesmiller	FPC/CR3
11. Mike Rencheck	FPC/CR3
12. Jim Andrews	FPC/CR3
13. Jim Warren	FPC/CR3

Enclosure 1

Enclosure 2

Nuclear Regulatory Commission

Florida Power Corporation

Technical Meeting

October 28, 1997

AGENDA

- Introduction
- EDG Protective Relaying
- EDG Power Uprate
- EDG Licensing Action Items
- Conclusion

NRC PRESENTATION
OCTOBER 28, 1997

DESIGN CRITERIA USED FOR PROTECTIVE RELAYING OF EDG BUS

PRESENTED BY: JERRY CAMPBELL

PROBLEM STATEMENT

- **A modification performed in 1987 to the protective relay design of the EDG's was NRC identified as a USQ and a violation. The added relays do not meet Reg. Guide 1.9, Revision 2.**

MAR INSTALLATION IN 1987

REASON FOR INSTALLATION

- Over-current protection of the source breakers only tripped the source breakers, but did not prevent the EDG Breaker from closing onto a faulted ES bus.
- No protection to prevent reclosing of the EDG Breaker for a faulted ES bus.
- No over-power protection when the EDG was operated in parallel with the switchyard.

DESIGN CRITERIA REVIEWED FOR 1997 MODIFICATION

Reg. Guide 1.9, Revision 2

- **IEEE 387-1984-Standard Criteria for Diesel-Generator Units Applied as Standby Power Supplies for Nuclear Generating Stations.**
- **IEEE 741-1990-Standard Criteria for the Protection of Class 1E Power Systems and Equipment in Nuclear Power Generating Stations.**
- **IEEE 242-1986-Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems.**
- **Evaluated protective relay design practices used at other Nuclear Stations for Bus Protection on Diesel-Generators used as standby power supplies.**

SUMMARY OF DESIGN CRITERIA USED AT OTHER NUCLEAR STATIONS

- No redundant or coincidental Bus Protective Relay trip logic.
- No bypassing of Bus Protective Relay trips during normal or ES actuation.
- Bus Protective Relay logic either trips or prevents the closing of the diesel breaker and associated feeder breakers for the ES Bus.

DESIGN CRITERIA FOR 1997 MODIFICATIONS TO PROTECTIVE RELAYING ON EDG

- Original plant design criteria.
- IEEE 242-1986 for bus relay protection schemes.
- Industry practices.

1997 CHANGES TO THE 1987 MODIFICATION

- The over-current relays (51Vs) installed in 1987 for ES Bus protection will be rewired to trip and/or prevent closing the diesel breaker for a fault on the ES Bus.
- Original Protective Relaying modified in 1987 will be rewired to only trip and/or prevent closing the diesel breaker.
- The over-power relays only trip the Bus source breaker and do not trip the diesel breaker under normal or ES actuation conditions.

Comparison of CR-3 with Industry for Bus Protection Trip Logic

PLANT	51'S	51V's	87G's	87B	*Trip EDG Unit	Trip EDG Breaker	BYPASSED DURING ES ACT.
A	S	S	S	N/A	N	Y	N
B	S	S	S	N/A	N	Y	N
C	S	N/A	S	N/A	N	Y	N
D	S	N/A	S	S	N	Y	N
E	S	S	S	N/A	N	Y	N
CR-3	S	S	S	N/A	N	Y	N

S--SINGLE CHANNEL LOGIC

Y--YES

N--NO

*--ALL PLANTS TRIP DIESEL UNIT FOR A GENERATOR DIFFERENTIAL

CONCLUSION

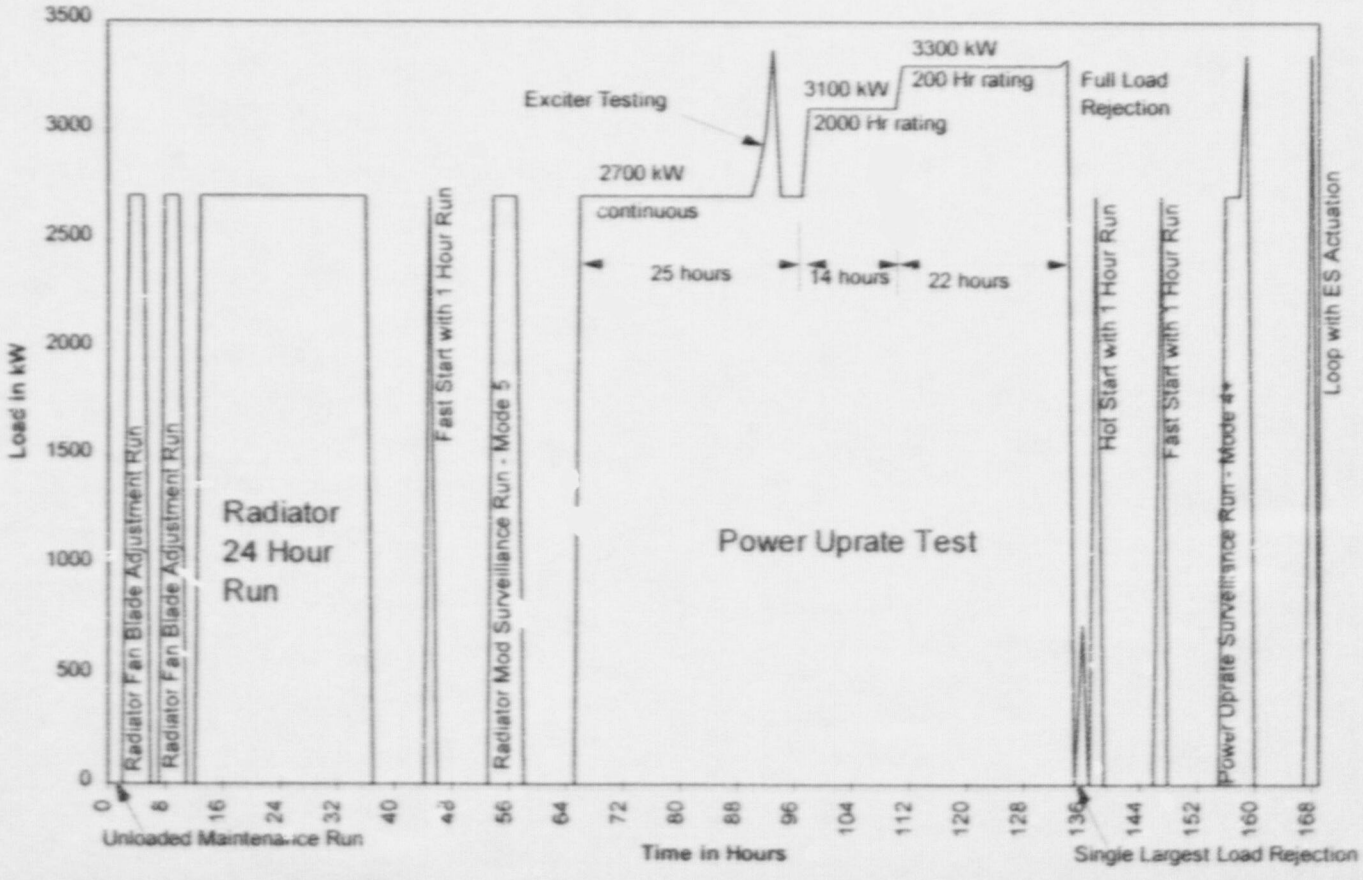
- **The design is consistent with Reg. Guide 1.9, Rev 2.**
- **The design is consistent with IEEE 242-1986.**
- **Protective relaying is used extensively throughout the power industry and is considered highly reliable.**
- **Single channel, non-bypassed bus protective relay logic is consistent with the CR-3 original design philosophy and is also consistent with other contacted nuclear utilities.**

EDG TEST PLAN

EDG Qualification

- Engine Modifications -
  - Testing by vendor (Coltec)
  - Onsite testing by BG&E, including 25 starts
  - 3 years operation by BG&E, including monthly surveillance testing starts
  - FPC site testing
- Radiator Modifications -
  - Similarity to original radiator configuration
  - FPC site testing

EDG Testing Profile



Summary of EDG Reliability Testing After Radiator Replacement

EDG Train	Total Starts	Load Runs	Oper. Hours
"A"	21	17	82.5
"B"	13	9	50

- Includes starts and load runs since installation of new turbochargers and intercoolers.
- "A"train values are actual, "B" train values are estimates.

Summary of EDG Reliability Testing After Uprate Testing

EDG Train	Total Starts	Load Runs	Oper. Hours
"A"	24	20	145.5
"B"	17	12	113

- Includes starts and load runs since installation of new turbochargers, intercoolers, and radiators.
- Values are estimates.

EDG Historical Reliability

- Number of start failures since 1990 - 1
  - 1991 - fuel header check valve leak
- Number of load run run failures since 1990 - 0
- EDG availability since 1990 - 99.06%
  - Includes 1997 YTD

Third Party Review of EDG Test Plan

Review performed by:

- MPR Associates Inc.
- The Woodard Corporation
- IEEE 387 Working Group Members

EDG Testing -
Summary and Questions

EMERGENCY DIESEL GENERATOR

LICENSING ACTIONS

- Temporary Tech. Spec. Amendment
  (LOPS Relay Testing Surveillance)
- EDG Room Fans (USQ)

  FSAR Amendment (LAR 216)
- EDG Protective Relays (USQ)
  FSAR Amendment (LAR 219)
- EDG Uprate Tech. Spec. Amendment
  (Part of TSCRN 210)
- Approvals Needed by November 8, 1997
  - 'B' Diesel Modifications will be Complete
  - Ready to Start Testing