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SUBJECT: Responds to station blackout rule re plant capability of maintaining core cooling & containment integrity.

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L-89-144
10 CFR 50.63

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

Re: Turkey Point Units 3 and 4
Docket Nos. 50-250 and 50-251
Information to Resolve Station Blackout

On July 21, 1988, the Nuclear Regulatory Commission (NRC) amended its regulations in 10 CFR, Part 50 by adding a new section, 10 CFR 50.63. This new regulation requires that each light-water-cooled nuclear power plant be able to withstand and recover from a station blackout (SBO) of a specified duration. It also identifies the factors that must be considered in specifying the station blackout duration. Section 50.63 requires that, for the station blackout duration, the plant be capable of maintaining core cooling and appropriate containment integrity. Additionally, 10 CFR 50.63 requires that each licensee submit the following information:

1. A proposed station blackout duration including a justification for the selection based on the redundancy and reliability of the onsite emergency AC power sources, the expected frequency of loss of offsite power, and the probable time needed to restore offsite power;
2. A description of the procedures that will be implemented for station blackout events for the duration (as determined in 1 above) and for recovery therefrom; and
3. A list and proposed schedule for any needed modifications to equipment and associated procedures necessary for the specified SBO duration.

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L-89-144
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Florida Power & Light Company (FPL) has evaluated the design features of Turkey Point's nuclear units using the criteria specified in 10 CFR 50.63. The evaluation also used guidance in Regulatory Guide 1.155, "Station Blackout", and NUMARC 87-00, "Guidelines and Technical Bases for NUMARC Initiatives Addressing Station Blackout at Light Water Reactors." The result of FPL's assessment is provided in Attachment A. Attachment B provides a description of the procedures that are in place but will be modified to meet the rule, or new procedures which are proposed to reflect the modifications FPL will make. Attachment C provides a summary description of the proposed modifications and a proposed implementation schedule to address the requirements of the rule.

If there are any questions please contact us.

Very truly yours,


W. F. Conway
Senior Vice President-Nuclear

WFC/RWG/cm

Attachments

cc: Stewart D. Ebnetter, Regional Administrator, Region II, USNRC
Senior Resident Inspector, USNRC, Turkey Point Plant

ATTACHMENT A

PROPOSED STATION BLACKOUT DURATION

NUMARC 87-00, Section 3 and Regulatory Guide 1.115 Tables 2 through 8 were used to determine the proposed SBO duration. For the Turkey Point Site nuclear units the station blackout duration evaluation was determined for the existing site electrical configuration and for the future enhanced site electrical configuration.

SBO Duration

	<u>Existing Site Electrical Configuration</u>	<u>Existing Site Configuration Implementing NUMARC Initiative #1</u>	<u>Future Enhanced Electrical Configuration</u>
1. Extremely Severe Weather (ESW) Group (see bases 1)	4	4	4
2. Severe Weather Recovery (SWR) Group (see bases 2)	1	1	1
3. Severe Weather (SW) Group (see calculation 3)	3	3	3
4. Independence of offsite Power Group	I 1	I 1	I 1
5. Offsite Power Design Characteristic	P2	P2	P2
6. Emergency AC Power Config.	D	A	A
7. Acceptable SBO Duration	8 hours with commitment to 0.975 EDG Reliability	4 hours with commitment to 0.95 EDG Reliability	4 hours with commitment to 0.95 EDG Reliability

BASES

- 1) Hurricane frequency for the Turkey Point nuclear site was studied by the NRC through independent contractor Sandia National Laboratory (i.e. SAND 86-2377) and by FPL through independent contractor Dames and Moore (#4598-144-09). The mean value of wind speed frequencies for 125 mph as reported by Sandia and Dames and Moore is 6.25×10^{-3} /yr and 4.9×10^{-3} /yr respectively. Both studies have used data from the U.S. Weather Bureau. The results define the extremely severe weather groups for Turkey Point as ESW Group 4 (i.e., $3.3 \times 10^{-3} < e < 1 \times 10^{-2}$).
- 2) Current FPL emergency procedures include severe weather (hurricane) actions. FPL emergency procedures encompass plant shutdown and AC power restoration.

The Turkey Point nuclear site currently has five (non-safety) blackstart diesels, any one of which has the capacity to safely shut down both units to hot standby conditions. Any two of the five (5) diesels can be aligned via a dedicated line to the emergency buses via the "C" bus in approximately 20 minutes. The estimated failure probability of all five (5) (i.e., total system failure), diesels to start and load, including common mode failure, is 1.5×10^{-3} /yr. The estimated probability of both EDG failures and five blackstart diesels to start, and load in event of a loss of offsite power is less than 1×10^{-5} per year.

In addition, existing system grid restoration procedures assign the highest priority to restoring off-site power to the Turkey Point Plant (PTN). Gas turbines at FPL's Lauderdale or Port Everglades sites can be energized and aligned to the Flagami-Turkey Point Unit 2, 230 kv line. Power to the startup transformers at PTN can be supplied in less than one hour (ref: Report on System Disturbance - May 17, 1985).

- 3) Computational bases:
 $f = (1.3 \times 10^{-4}) h_1 + (b) h_2 + (0.012) h_3 + (c) h_4$
 $h_1^* = 0$
 $b^* = 12.5$
 $h_2^* = 1.2 \times 10^{-5}$
 $h_3^* = 0.14$
 $c^* = 0$

 $f = 1.83 \times 10^{-3}$

*Per NUMARC 87-00, Section 3

ATTACHMENT B

DESCRIPTION OF PROCEDURES
FOR RESOLUTION OF
STATION BLACKOUT

Resolution of station blackout for nuclear units 3 and 4 at the Turkey Point site will coincide with the emergency power system enhancement project. This project is currently scheduled for completion late in 1990 (Unit 3 Diesel Tie-In and Unit 4 Cycle 13 Refueling Outages). Below are the procedures that will be used to cope with a station blackout event:

1. New emergency procedure to cross-connect any one EDG to its bus and the same bus on the other unit. Loss of all AC power on units 3 or 4 will be precluded by developing a procedure which will allow the operators to use any one (1) of four (4) EDG in the enhanced system design to safely shut down and maintain both nuclear units in hot standby conditions for 4 hours.
2. Existing procedures which allow use of the five (5) blackstart diesel generators will be modified to accommodate the two new EDG's.
3. The existing emergency procedure will be modified to include additional criteria for unit shutdown for hurricanes.

ATTACHMENT C

PROPOSED DESIGN MODIFICATION TO RESOLVE STATION BLACKOUT

I. EMERGENCY POWER SYSTEMS (EPS) ENHANCEMENT PROJECT

Based upon our NRC submittal on June 23, 1988, FPL will be adding two (2) new Emergency Diesel Generators along with new 4KV switchgear, 480V load centers, motor control centers, battery chargers and 125 VDC distribution panels to the existing emergency power system (EPS) at Turkey Point Units 3 and 4. It is FPL's intention to implement the modifications required to meet the Station Blackout Rule 10 CFR 50.63 issued on July 21, 1988 coincident with the EPS Enhancement Project.

II. LICENSING CRITERIA TO RESOLVED STATION BLACKOUT

FPL will meet the requirements of the Station Blackout Rule by applying criteria depicted in the "Licensing Basis Criteria" document (attachment C.1). The Nuclear Regulatory Commission staff should indicate approval or disapproval of any sections of this document prior to final resolution of station blackout for Turkey Points Units 3 and 4.

III. INTERTIE UNITS 3 AND 4 VIA NEW SWING 4KV BUSES 3D/4D

A. DESCRIPTION OF CHANGE

FPL proposes to intertie Units 3 and 4 via the new swing switchgears (buses) 3D/4D. This approach, as illustrated on attached Figure 1-T, would utilize a new tie between 4KV buses 3D and 4D which are being installed as part of the EPS Enhancement project. Since each swing switchgear has the capability to receive power from its A or B Emergency Diesel Generator (EDG), at least one swing switchgear is always assured a source of power. With the new intertie, a safety bus on the blackout unit could then be reenergized via the 3D and 4D switchgear within ten minutes from the control room.

B. MATERIAL AND INSTALLATION IMPACTS

Since the breakers required to provide the intertie are being provided as part of EPS Enhancement Project, the only material cost associated with the blackout modifications is that of providing associated control switches, indicating lights, and cable/raceway for power/control circuits.

C. INSPECTION, MAINTENANCE AND TESTING

The breakers and associated control will be inspected, maintained and tested to the same criteria as safety-related equipment to assure their availability/reliability for station blackout.

D. ELECTRICAL AND INSTRUMENTS/CONTROLS IMPACTS

Manual operation of the intertie breakers is controlled through the use of a key-operated control switch in the control room.

E. PROPOSED IMPLEMENTATION

FPL has scheduled implementation of all station blackout modifications including development of necessary procedures to coincide with the EPS Enhancement Project as per the Turkey Point Integrated Schedule. The current integrated schedule completion date is the end of 1990 (Unit 3 Diesel Tie-In and Unit 4 Cycle 13 Refueling Outages).

Attachment C.1

LICENSING BASIS CRITERIA
TO
RESOLVE STATION BLACKOUT
FOR
FLORIDA POWER & LIGHT
TURKEY POINT NUCLEAR UNITS

1.0 PURPOSE

The information provided by this document provides the licensing criteria that will be used by FPL to meet the requirements of the Station Blackout (SBO) rule. It is intended to form the basis for agreement between FPL and the NRC for satisfying the rule. When implemented it will meet requirements of 10 CFR 50.63 "Loss of All Alternating Current Power".

2.0 INTRODUCTION

Resolution of Unresolved Safety Issue (USI) A-44, STATION BLACKOUT, was concluded by the NRC on June 21, 1988 by amending its regulations (i.e., 10 CFR 50) to require that light water cooled nuclear power plants be capable of withstanding a total loss of alternating current (AC) electric power (i.e. station blackout).

3.0 DISCUSSION

Resolution of the Station Blackout issue for FPL nuclear units is dictated by criteria embodied by the NRC final rule, Regulatory Guide 1.155 "STATION BLACKOUT" and NUMARC document 87-00 "Guidelines and Technical Bases for NUMARC Initiatives Addressing Station Blackout at Light Water Reactors".

Florida Power and Light is required by law to comply with the "rule" as presented in 10CFR50.63. FPL is obligated to follow the guidance of the regulatory guide to implement the rule. FPL has also voluntarily agreed, through executive commitment, to implement five (5) NUMARC initiatives. All these documents were used to develop FPL's Licensing Basis Criteria document for Turkey Point nuclear units.

4.0 SCOPE AND LIMITATIONS

The rule and supporting guidance documents allow flexibility in addressing station blackout. This document provides the licensing criteria that are the bases for FPL to resolve this issue. It is not intended to address all options. Specifically, resolution of station blackout for Turkey Point nuclear units shall be resolved by use of an alternate safety related, class 1E, seismic category 1, power source with the ability to align the source in 10 minutes.

5.0 REQUIREMENTS OF THE RULE

5.1 One (1) Emergency Diesel Generator (EDG) shall be made available in 10 minutes after the onset of a station blackout (10CFR50.63(c)(2)):

- a) The 10 minute clock shall start after: operators perform the immediate steps in the Emergency Operating Procedures (EOP's) verify scram, other primary system parameters, attempt to restore offsite power and attempt to start the EDG's from the control room per the EOP's.
 - b) The EDG shall be made available to the nonpowered buses, by demonstration, in 10 minutes, after performing items in section 5.1 (a).
 - c) The EDG shall be capable of supporting all necessary loads to place units 3 and 4 in hot standby (i.e., safe shutdown) for 4 hours.
 - d) All EDG loads for station blackout shall be identified in a load study for purposes of identification in the "TOTAL LOSS OF AC POWER EOP".
 - e) To provide reasonable assurance of success by analysis, the failed state frequency for the shared SBO electrical configuration shall not exceed 1×10^{-5} /year.
 - f) Independence between existing safety-related systems shall be provided by a minimum of two (2) class 1E circuit breaker administratively controlled from the control room.
 - g) All design criteria used to address SBO modifications shall conform with criteria applicable to the unit's current licensed design bases. To the extent that the licensed design basis commits to regulatory guides, industry design codes and standards, they shall be used.
 - h) The SBO modifications shall not change the licensed configuration of units 3 and 4.
- 5.2 Loss of Coolant Accident - Design Bases Accident (LOCA-DBA) shall not be considered: (10 CFR 50.2)
- a) The SBO event is assumed to occur without postulating any other concurrent Design Bases Accident (DBA).
 - b) The SBO event is assumed to occur after a Loss of Offsite Power (LOOP) and failure to start three of four EDG's (i.e., emergency AC power sources and minimum redundancy requirements for all units).

- c) No other single failures are assumed or postulated during the SBO event. Seismic, flooding and fire induced SBO events shall not be considered concurrent with this design.
- d) Non-LOCA loads shall be used as a SBO design bases for EDG loading. Loads identified to be placed on the EDG shall provide assurance that the units can survive the SBO event for four (4) hours. These loads, as a minimum, shall support the following functions:
 - 1) water for decay heat removal
 - 2) HVAC in critical or "dominant area of concern" to assure equipment operability
 - 3) cooling for RCP seals to preclude seal failures
 - 4) fuel oil for EDG operability
 - 5) power for valves required for containment integrity

5.3 Recovery Procedure(s)

- a) A procedure(s) shall be developed to address actions to be taken to mitigate and recover from the SBO event. The procedure shall include containment isolation, AC recovery and use of (1) EDG to mitigate SBO for the required duration.
- b) The procedure(s) shall include and address actions taken in the 24-hour period prior to anticipated hurricane force winds.

6.0 COMMITMENT TO NUMARC 87-00

Criteria provided in this document meets all five (5) industry initiatives committed to the NRC by NUMARC. In addition, criteria provided in this document conforms to NUMARC 87-00 "Guidelines and Technical Bases for NUMARC Initiatives Addressing Station Blackout at Light Water Reactors".

7.0 REQUIRED SUBMITTALS

7.1 Information submittal, April 17, 1989

- a) By use of tables 1 through 8 in Reg Guide 1.155 FPL shall propose a station blackout duration time. The duration time may be modified, with justification, to take credit for the addition of 2 EDG's (to reduce coping time to 4 hours).
- b) Description of procedures that will be implemented for SBO events for the duration determined in (a).
- c) Description of modifications to the facility to meet requirements of the SBO event and a proposed schedule for implementation.

7.2 Implementation Schedule

A final implementation schedule shall be submitted in accordance with 10 CFR 50.63(c)(4).

