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BECo 89-057
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Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

License DPR-35
Docket 50-293

STATION BLACKOUT (SBO) FINAL RULE
10CFR50.63(c)(1) INFORMATION SUBMITTAL (TAC #68585)

Dear Sir:

This letter provides Pilgrim Nuclear Power Station information in response to the final Station Blackout Rule in subsection 10CFR50.63(c)(1), implementation of station blackout requirements.

This information is attached in the enclosure and follows a generic format based upon NUMARC document, "Generic Response to Station Blackout Rule for Plants Using Alternate AC Power". The NUMARC document was approved by the NRC in a letter, dated October 7, 1988 (TAC 40577). The following are addressed:

- A proposed station blackout duration including 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.

- A description of the procedures that will be implemented for station blackout events for the duration and for recovery therefrom.

- A list and proposed schedule for any needed modifications to equipment and associated procedures necessary for the specified station blackout duration.

Boston Edison Company installed a non-Class 1E, 2000 KW Station Blackout Diesel Generator (SBO-DG) during Refueling Outage #7 as a part of the Safety Enhancement Program. This SBO-DG provides standby power to shutdown busses for coping with station blackout events and will be designated as an Alternate AC (AAC) power source after installing the modifications described in the enclosure. In addition, we are planning to complete a series of equipment modifications enabling the operator to energize the shutdown busses

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from the SBO-DG within 10 minutes of a Station Blackout event. These modifications will also allow us to demonstrate by test the availability of the SBO-DG to power the shutdown busses within 10 minutes of the onset of an SBO event.

In accordance with 10CFR50.63(c)(3), completion of our proposed actions will not exceed 2 years after our being notified of NRC acceptance. We currently plan completion in RFO #8.

R. G. Bird

Enclosure: Boston Edison Company Response
to Station Blackout Rule

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BOSTON EDISON COMPANY
RESPONSE TO STATION BLACKOUT RULE

(Based on NUMARC Generic Response to Station Blackout Rule for Plants Using Alternate AC Power)

A. Proposed Station Blackout Duration

NUMARC 87-00, Section 3 was used to determine a proposed Station Blackout (SBO) duration of 16 hours. This method uses plant specific data and characteristics to determine coping duration. The formula for calculating coping duration uses data in the areas of 1) AC Power Design Characteristics, 2) Emergency AC Power Configuration, 3) Target Emergency Diesel Generator Reliability, and 4) Alternate AC Source Availability and Configuration. A description of Pilgrim plant specific data follows:

1. AC Power Design Characteristic Group is determined based on:

   a. Expected frequency of grid-related Loss of Offsite Power (LOOP) exceeds once per 20 years;

   b. Estimated frequency of LOOPs due to extremely severe weather is .0068 per year;

   c. Estimated frequency of LOOPs due to severe weather is 0.0683 per year;

   d. The offsite power system consists of two independent sources.

2. The emergency AC power configuration is as follows:

   a. There are 2 emergency AC power supplies (the two emergency diesel generators) not credited as alternate AC power sources;

   b. Only one emergency AC power supply is necessary to operate safe shutdown equipment following a loss of offsite power.

3. The target EDG reliability is 0.95. This value was selected based on having a nuclear unit average EDG reliability for the last 100 demands greater than 0.95 consistent with NUMARC 87-00, Section 3.2.4.

4. When the modifications are complete, an Alternate AC (AAC) power source will be available at Pilgrim Nuclear Power Station (PNPS) that meets the criteria specified in Appendix B to NUMARC 87-00.

   The AAC power source will be available within ten minutes of the onset of the SBO event and will have sufficient capacity and capability to operate systems necessary for coping with a SBO for the required duration of 16 hours to bring and maintain the plant in safe shutdown. Since AC power will always be available, we have not addressed Class 1E battery capacity, compressed air, and containment isolation.

   The attached Figure 1 shows the configuration of the non-class 1E AAC SBO-Diesel Generator (SBO-DG) installed during RFO#7.

B. Procedure Description

Plant procedures have been revised to meet the requirements of the new rule. Further revisions will be made to formally interface with offsite AC restoration procedures and to accommodate the modifications outlined in Section C of this enclosure. A list of affected procedures are included below:

Plant procedures in place to cope with SBO Events are as follows.

1. Station Blackout response procedures are:

   a) 5.3.31 - Station Blackout
   b) 2.2.146 - Station Blackout Diesel Generator for Control of Electrical Malfunctions
   c) Emergency Operating Procedures (EOPs) 1-9 - Emergency Operating Procedures for Control of Reactor Pressure Vessel (RPV), Primary Containment, Secondary Containment and Radioactive Releases.

   By procedure, the response to a SBO event is to control the integrity of RPV, Primary Containment, Secondary Containment, and radioactive release parameters using EOP-1 through EOP-9. Power restoration steps are in accordance with Procedure 5.3.31, Station Blackout, and 2.2.146, Station Blackout Diesel Generator. These procedures will be further revised upon completion of equipment modifications identified in Section C of this enclosure.

   Regulatory Guide 1.155, Paragraph 1-3, specifies that procedures used to restore emergency AC power be integrated with plant specific technical guidelines and EOP's developed in response to NUREG 0737, Supplement 1. A SBO is a specific event. The PNPS EOPs are symptomatic (as opposed to event oriented), developed from Revision 4 of the BWR Owner's Group Emergency Procedure Guidelines. As such, EOPs contain steps required for mitigating a station blackout, with the exception of instructions on the restoration of AC power. In order to maintain the EOPs as symptomatic, the integration of event specific power restoration steps will not be added to the EOPs.

2. The following is a preliminary summary of those procedures requiring creation or alteration in order to meet the rule based upon the modifications identified in Section C of this enclosure.

	Procedure#	Title	Planned Revisions
a)	2.2.12.2	Station Blackout Diesel Generator Daily Surveillance	Add parameters to daily readings as required by proposed modifications
b)	2.1.16	Nuclear Power Plant Tour	Add parameters to readings each shift as required by proposed modifications

	Procedure#	Title	Planned Revisions
c)	2.2.146	SBO Diesel Generator	Update procedure to reflect new control logic
d)	ARPs	Alarm Response Procedure	Develop new Alarm Panel C-190 Response Procedures for SBO Diesel Generator
e)	8.C.18	4.16 KV/480 V Switchgear Surveillance	Add more rigorous surveillance requirements as needed
f)	8.9.16	Manual Start and Load of Blackout Diesel	Develop a procedure to manually start and load the SBO Diesel on a periodic basis
g)	5.3.31	Station Blackout	Revise as necessary to reflect proposed modifications
h)	New	Diesel Battery Surveillance	Develop a procedure to periodically check battery for SBO diesel
i)	2.2.19/ 2.2.20	Residual Heat Removal/Core Core Spray System	Revise as required to reflect proposed modifications
j)	ARPs	Alarm Response Procedures	Develop ARPS to reflect annunciation changes in circuits for RHR and Core Spray Breakers

3. AC Power Restoration Procedure, per NUMARC 87-00, Section 4.2.2.

Plant procedures 5.3.31 "Station Blackout" and 2.2.146 "SBO Diesel Generator" specify the onsite restoration of AC power to plant systems. The offsite AC power portions of NUMARC 87-00, Section 4.2.2 are not applicable to PNPS since the plant is located in Rhode Island Eastern Massachusetts and Vermont Energy Control (REMVEC) System. Boston Edison Company will modify Station Blackout procedures to interface with REMVEC.

4. Exception to NUMARC Guidance:

Severe Weather Procedure, per NUMARC 87-00, Section 4.2.3.

Plant procedure 5.2.2, "High Winds (Hurricanes)", addresses severe weather conditions. This procedure requires the plant to reduce power to 130 MWe before the arrival of high winds, and start and load emergency diesel generators eight (8) hours prior to the arrival of high winds.

There is no established requirement to shutdown the plant prior to the arrival of high winds (hurricane). We do not agree with the NUMARC guidance regarding the need to shutdown the plant two hours prior to the arrival of severe weather conditions.

C. Proposed Modifications and Schedule

1. The following modifications will be made to enable the operator to energize the shutdown busses from the SBO-DG (AAC) power source within 10 minutes of a SBO event from the control room in compliance with 10CFR50.63(c)(2):

   a) Replace existing control switches with PULL-TO-LOCK (PTL) switches at panel C903 in the Main Control Room. These switches operate the 4KV feeder breakers to the Residual Heat Removal (RHR) and Core Spray (CS) pumps.

   b) Replace existing control switches with PTL switches at Panel C3 in the Main Control Room. These switches operate the shutdown transformer feeder breakers to 4KV shutdown busses A5 and A6.

   c) Install and wire switches on panel C3 in the Main Control Room to initiate the load shedding logic on trains A and B. The loads to be shed include the 4KV CRD Water pumps and other 480v loads that are not required during SBO.

   d) Provide wiring from the replacement PTL switches to the annunciators to annunciate the PTL switch positions.

   e) Modify the plant simulator to reflect the above modifications.

   f) Revise affected documents including design bases, drawings, procedures, and sections of the FSAR.

2. The following modifications are needed to allow BECo to load test the SBO-DG on the 23kv system on a regular basis, in accordance with the guidance of Regulatory Guide 1.155 for "STATION BLACKOUT", Regulatory Position C.3.3.5.

   Relay protection will be provided that will rapidly trip (open) circuit switcher F15 at the Rocky Hill substation should a SBO-DG fault occur when the SBO-DG is being tested and is generating power onto the 23kv line. These changes will not affect the ability of the 23kv line to PNPS to perform its intended design function as a secondary offsite power source.

3. There is sufficient condensate inventory and the AAC source has the capacity and capability to power the equipment necessary to cope with a SBO for the required coping duration determined in accordance with NUMARC 87-00, Section 3.2.5, as identified below:

a) Condensate Inventory For Decay Heat Removal

We determined from Section 7.2.1 of NUMARC 87-00 that 176,784 gallons of water are required for decay heat removal for the 16 hour coping duration. Technical Specifications require a minimum condensate storage tank level of 200,000 gallons of water, exceeding the required quantity for coping with a 16-hour station blackout.

b) Effects of Loss of Ventilation

Our AAC power source provides power to HVAC systems serving dominant areas of concern to achieve and maintain safe shutdown during station blackout. Therefore, according to NUMARC 87-00 Sections 7.2.4 and 2.7.1 the effects of loss of ventilation were not assessed.

No modifications and/or procedures are required to provide reasonable assurance for operability of ventilation equipment.

c) Reactor Coolant Inventory

The AAC source powers the necessary make-up systems to maintain adequate reactor coolant system inventory to ensure that the core will be cooled for the required coping duration.

4. Schedule

In accordance with 10CFR50.63(c)(3), completion of our proposed actions will not exceed 2 years after our being notified of NRC acceptance. We currently plan completion in RFO #8.

Attachment:

Figure 1, PNPS AAC Configuration

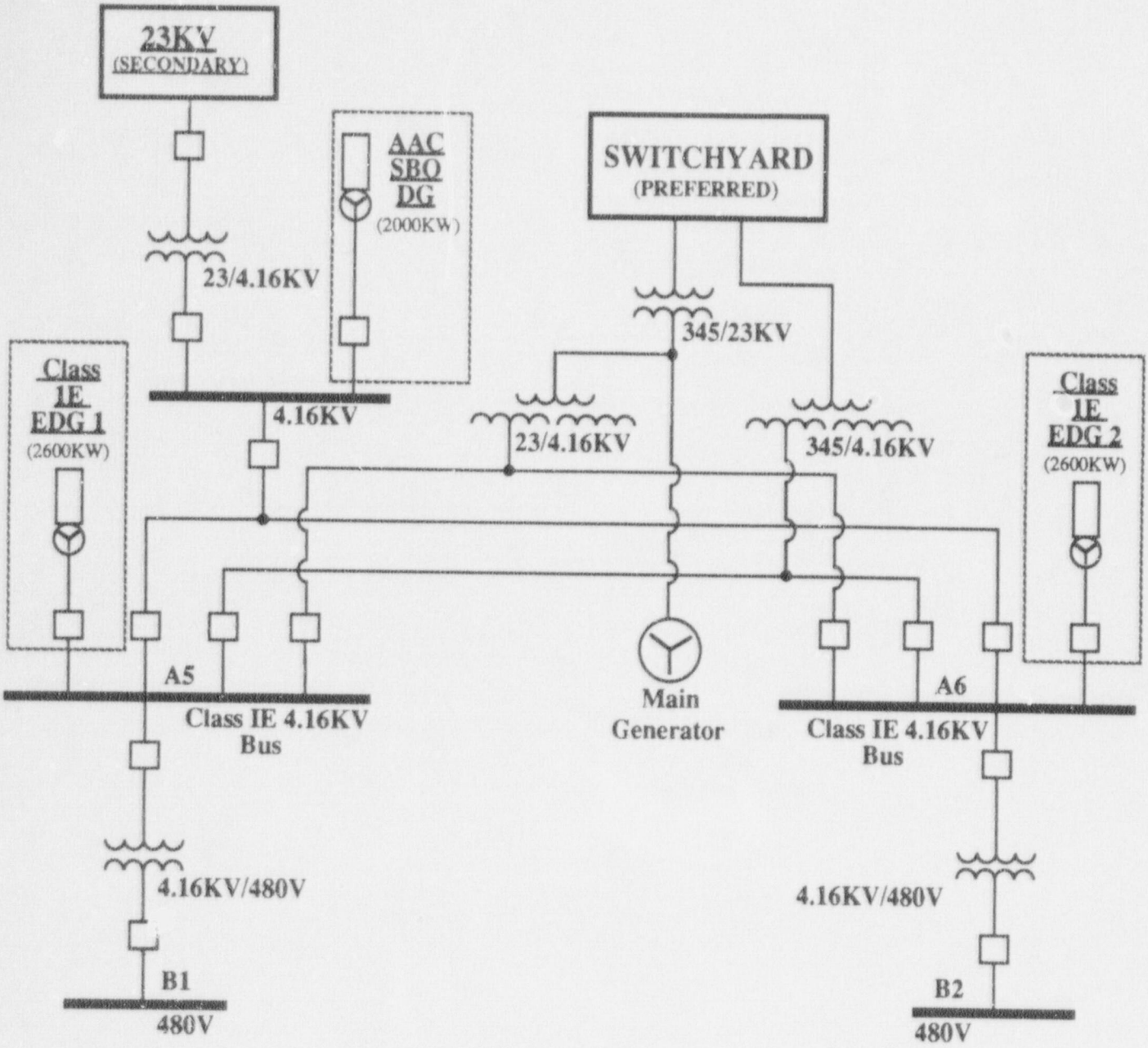

FIGURE 1

ALTERNATE AC (AAC) CONFIGURATION
NON CLASS 1E DIESEL GENERATOR