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ACCESSION NBR: 8904280026      DOC. DATE: 89/04/17      NOTARIZED: NO      DOCKET #  
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       50-388 Susquehanna Steam Electric Station, Unit 2, Pennsylv      05000388  
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SUBJECT: Submits info on station blackout rule 10CFR50.63.

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Director of Nuclear Reactor Regulation  
Attention: Dr. W. R. Butler, Project Director  
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Division of Reactor Projects  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

SUSQUEHANNA STEAM ELECTRIC STATION  
STATION BLACKOUT RULE  
10CFR50.63  
PLA-3166      FILES A17-2/P73-1

Dear Dr. Butler:

On July 21, 1988, the Nuclear Regulatory Commission (NRC) amended its regulations in 10 C.F.R., Part 50. A new Section, 50.63, was added which requires that each light-water-cooled nuclear power plant be able to withstand and recover from a station blackout (SBO) of a specified duration. Utilities are expected to have the baseline assumptions, analyses and related information used in their coping evaluation available for NRC review. It also identifies the factors that must be considered in specifying the station blackout duration and that the plant be capable of maintaining core cooling and appropriate containment integrity. Section 50.63 further requires that each licensee submit the following information:

- o 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;
- o 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
- o A list and proposed schedule for any needed modifications to equipment and associated procedures necessary for the specified SBO duration.

The NRC has issued Regulatory Guide 1.155 "Station Blackout" which describes a means acceptable to the NRC Staff for meeting the requirements of 10 C.F.R. 50.63. Regulatory Guide (RG) 1.155 states that the NRC Staff has determined that NUMARC 87-00 "Guidelines and Technical Bases for NUMARC Initiatives Addressing Station Blackout At Light Water Reactors" also provides guidance

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that is in large part identical to the RG 1.155 guidance and is acceptable to the NRC Staff for meeting these requirements. Table 1 to RG 1.155 provides a cross-reference between RG 1.155 and NUMARC 87-00 and notes where the RG takes precedence.

Pennsylvania Power & Light has evaluated Susquehanna Units 1 and 2 against the requirements of 10CFR50.63 using guidance from NUMARC 87-00 (except where Regulatory Guide 1.155 takes precedence) and in some instances plant specific analyses. The results of our evaluation are detailed below.

### Proposed Station Blackout Duration

The following plant factors were identified in determining the proposed station blackout duration:

NUMARC 87-00, Section 3 was used to determine a proposed SBO duration of four hours. No modifications were required to attain this proposed coping duration category.

- o AC Power Design Characteristic Group is P1 based on:
  - Expected frequency of grid-related LOOPS does not exceed once per 20 years.
  - Estimated frequency of LOOPS due to extremely severe weather places the plant in ESW Group 2.
  - Estimated frequency of LOOPS due to severe weather places the plant in SW Group 2.
  - The offsite power system is in the I1/2 Group.
- o The emergency AC power configuration group is D based on:
  - There are four emergency AC power supplies not credited as alternate AC power sources.
  - Three emergency AC power supplies are necessary to operate safe shutdown equipment following a loss of offsite power.
- o The target Emergency Diesel Generator reliability is 0.975.
  - A target EDG reliability of 0.975 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.

### Procedure Description

Plant procedures have been reviewed and modified, if necessary, to meet the guidelines in NUMARC 87-00, Section 4 in the following areas:

- o AC power restoration (PP&L Procedure EO-000-031) per NUMARC 87-00, Section 4.2.1 and 4.2.2;
- o Severe weather (PP&L Procedure ON-000-002) per NUMARC 87-00, Section 4.2.3.

Plant procedures have been reviewed and changes necessary to meet NUMARC 87-00, Section 4.2.1 will be implemented.

### Proposed Modifications and Schedule

The ability of Susquehanna to cope with a station blackout for four hours in accordance with NUMARC 87-00, Section 3.2.5 and as determined above; was assessed using NUMARC 87-00, Section 7 and Plant specific analyses with the following results:

#### Condensate Inventory For Decay Heat Removal

It has been determined from Section 7.2.1 of NUMARC 87-00 that 117,626 gallons of water are required for decay heat removal for the four hour duration category from NUMARC 87-00, Section 3.2.5. A plant specific analysis was performed which calculated a value of 93,293 gallons. The minimum permissible Condensate Storage Tank level per Technical Specifications is 135,000 gallons of water, which exceeds the calculated quantity for coping with a four hour station blackout.

No plant modification or procedure changes are needed to utilize additional water sources.

#### Class 1E Battery(ies) Capacity

A battery capacity calculation verifies that the Class 1E batteries (125V and 250V) have sufficient capacity to meet station blackout loads for four hours assuming loads not needed to cope with a station blackout are tripped. These loads are identified in plant procedures.

#### Compressed Air

Air-operated valves used for decay heat removal to cope with a station blackout for four hours have sufficient backup motive sources independent of the preferred and blacked out unit's Class-1E power supply to function for the four hours. No valves require manual operation or need backup sources for operation.



Effects of Loss of Ventilation

PP&L performed a plant-specific analysis to determine the effects of ventilation. This specific analysis, which more accurately models Susquehanna design, verified the assumption that the only areas of dominant concern were:

<u>AREA</u>	<u>TEMPERATURE</u>
HPCI Room	128°F
RCIC Room	128°F
Main Steam Tunnel	117°F

The control room complex for Susquehanna consists of a common control room and four relay rooms (upper and lower for each Unit).

The control room will not exceed 120°F during a station blackout, therefore it is not a dominant area of concern.

The two relay rooms in Unit 1 have been calculated to reach an ambient air temperature of 94°F (lower relay room) and 105°F (upper relay room) and are therefore not considered dominant areas of concern. Unit 2 is assumed to be identical to Unit 1.

Containment Isolation

The plant list of containment isolation valves has been reviewed to verify that valves which must be capable of being closed or that must be operated (cycled) under station blackout conditions can be positioned (with indication) independent of the preferred and blacked-out unit's Class 1E power supplies. No plant modifications and/or associated procedure changes were determined to be required to ensure that appropriate containment integrity can be provided under SBO conditions.

Reactor Coolant Inventory

The ability to maintain adequate reactor coolant system inventory to ensure that the core is cooled has been assessed for four hours using a calculated leakage of 100 gpm.

Diesel Generator Reliability Program

PP&L will enhance its emergency AC power source reliability program at Susquehanna. The program will be designed to maintain and monitor the reliability levels of each power source over time for assurance that the selected reliability levels are being achieved. This program will include the five features described in Regulatory Guide 1.155.



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Quality Assurance

A quality assurance program will be developed and incorporated into a Department procedure.

If you have any questions please contact D. J. Walters at (215) 770-6536.

Very truly yours,



H. W. Keiser

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