



Public Service  
Electric and Gas  
Company

**E. C. Simpson**

Public Service Electric and Gas Company P.O. Box 236, Hancocks Bridge, NJ 08038

609-339-1700

Senior Vice President - Nuclear Engineering

LR-N990196

**APR 26 1999**

United States Nuclear Regulatory Commission  
Document Control Desk  
Washington, DC 20555

**125 VDC BATTERY MARGINS  
SALEM AND HOPE CREEK GENERATING STATIONS  
DOCKET NOS. 50-272, 50-311, AND 50-354**

Ladies and Gentlemen:

Public Service Electric and Gas (PSE&G) is transmitting this letter to clarify the licensing and design basis for the 125 VDC battery margins for Salem and Hope Creek Generating Station for meeting Station Blackout (SBO) and Loss of Coolant Accident/Loss of Off-site Power (LOCA/LOOP) loading requirements.

In letters NLR-N91047 for Salem and NLR-N91048 for Hope Creek, dated March 28, 1991, concerning conformance with the SBO rule (10CFR50.63), PSE&G stated in section 7.2.2.1 that:

"The calculations for the SBO battery capacity use the lowest electrolyte temperature anticipated under plant normal operating conditions as required by NUMARC 87-00.

The calculations for the SBO battery capacity use a Design Margin of 1.1 as recommended by IEEE Standard 485 and as required by NUMARC 87-00.

An aging factor 1.25 has been used in calculating the SBO battery capacity as recommended by IEEE Standard 485 and as required by NUMARC 87-00."

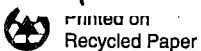
In the NRC's Safety Evaluation Report (SER) of Response to Station Blackout Rule for Salem dated January 13, 1992, section 2.2.2 states:

"Based on a review of the licensee's battery capacity calculations for SBO loads, we conclude that the licensee's assumed temperature correction factor 1.08 (based on an electrolyte temperature of 65 degrees F), a design margin of 1.1, and an aging factor of 1.25 are conservative and consistent with the IEEE-485 guidance. The licensee's battery calculations support an SBO coping duration of 4 hours."

21003

AD5010

9905070005 990426  
PDR ADOCK 05000272  
P PDR



Printed on  
Recycled Paper

Based on review of existing battery loads, PSE&G reassessed the battery margins required to meet a SBO under 10CFR50.59 and determined that the maintenance of a design margin of 1.0 meets the requirements of 10CFR50.63.

As stated in NUMARC 87-00, "Guidelines and Technical Bases for NUMARC Initiatives Addressing Station Blackout at Light Water Reactors," section 7.2.2 for assessing Class 1E Battery Capacity states in-part:

"The DC power requirements for a required station blackout may be estimated using the same methodology for which the plant is licensed. The generally accepted methodology is *IEEE Recommended Practice for Sizing large Lead Storage Batteries for Generating Stations and Substations* (IEEE-STD-485). IEEE-STD-485 incorporates design margins for aging and temperature correction that are addressed in various other industry standards such as *IEEE Recommended Practice for Maintenance, Testing and Replacement of large Stationary Type Power Plant and Substation Lead Storage Batteries* (IEEE-STD-450)."

The assumptions for a SBO event from NUMARC 87-00 is that:

"Immediately prior to the postulated SBO event, the reactor and supporting systems are within normal operating ranges for pressure, temperature, water level. All plant equipment is either normally operating or available from the standby state."

IEEE Standard 485 states under the section titled, "Design Margin," that, "it is prudent design practice to provide a capacity margin to allow for unforeseen additions to the dc system and less-than-optimum operating conditions of the battery due to improper maintenance, recent discharge, or ambient temperatures lower than anticipate, or both."

Based on the assumptions of NUMARC 87-00, the class 1E batteries would not be assumed to be operating in a less than optimum environment at the start of an SBO event. Since the design margin is to compensate for operating the battery in less than optimum conditions, maintenance of a design margin to meet the requirements of 10CFR50.63 is not required and the design margin could be reduced to 1.0. To meet the class 1E battery requirements for SBO for Salem and Hope Creek, a margin of 1.25 for aging and the appropriate temperature margin corresponding to the lowest electrolyte temperature anticipated under normal operating conditions must be maintained. Although a design margin

Document Control Desk  
LR-N990196

3

would not be required to meet SBO requirements, Salem and Hope Creek will maintain a design margin of 1.05.

For LOCA/LOOP loading, the 125 VDC batteries at Salem are required to meet the following margins as documented in the NRC's SER for Technical Specification Amendments 177 (Unit 1) and 158 (Unit 2):

"Regarding the staff's concern whether the batteries at Salem have enough design and aging margins, the licensee confirmed that its batteries are sized based on the basis of IEEE Std 485-1983 with appropriate margins (i.e., 145 percent battery capacity) to meet their required duty cycles.

Considering the licensee's confirmation of its battery margins...the staff finds that the battery cell parameters proposed by the licensee are comparable with the parameters shown in Table 3.8.6-1 of the WOG STS. Therefore, addition of Table 4.8.2.3-1 in the TS for Units 1 and 2 is acceptable."

The 145% capacity corresponds to a design margin of approximately 1.07. This design margin represents the design basis of the 125 VDC batteries at Salem for the LOCA/LOOP loading. As described in Table 8.3-6 of the Salem UFSAR, LOCA/LOOP loading battery capacity is evaluated for a two hour duration.

On October 31, 1995, the NRC approved Amendment 87 to the Hope Creek Technical Specifications for changes to the DC system surveillance requirements. In section 2.4 of the NRC's SER, the NRC stated:

"...This change takes into consideration that, while the battery is degraded, sufficient capacity exists to perform the intended function, and the revised time periods permit sufficient time to fully restore the cell parameters to normal limits. In addition, the licensee stated that the subject batteries were evaluated using a 25 percent additional capacity margin for aging compensation and possess a 5 to 10 percent design margin for load growth and/or less than optimum operating conditions.

Given that the proposed Table 4.8.2.1-1 format agrees with the applicable text of BWR/4 STS and design margin exists to mitigate any short-term degradation in the battery parameters, the NRC staff concludes that the revised TS Table 4.8.2.1-1 is acceptable..."



Document Control Desk  
LR-N990196

4

Based on the above amendment approval, the design basis for the Hope Creek batteries includes a minimum 5% design margin to compensate for less than optimum operating conditions.

In conclusion, to meet the requirements for SBO at both Salem and Hope Creek, 125 VDC battery design margin can be reduced to 1.0. However, both Salem and Hope Creek will maintain a design margin of 1.05 to meet SBO battery loading requirements. In addition, for LOCA/LOOP loading the Salem Units will maintain a minimum design margin of approximately 1.07 and Hope Creek will maintain a minimum design margin of 1.05.

If you have any questions regarding this submittal please do not hesitate to contact us.

*EC Simpson*



Document Control Desk  
LR-N990196

5

C Mr. H. J. Miller, Region I Administrator  
U. S. Nuclear Regulatory Commission  
475 Allendale Road  
King of Prussia, PA 19406

Mr. P. Milano, Licensing Project Manager - Salem  
U. S. Nuclear Regulatory Commission  
One White Flint North  
11555 Rockville Pike  
Mail Stop 0-8-B-1  
Rockville, MD 20852

Mr. R. Ennis, Licensing Project Manager - Salem  
U. S. Nuclear Regulatory Commission  
One White Flint North  
11555 Rockville Pike  
Mail Stop 14E21  
Rockville, MD 20852

Mr. S. Morris (X24)  
USNRC Resident Inspector  
Salem Generating Station

Mr. S. Pindale (X24)  
USNRC Resident Inspector  
Hope Creek Generating Station

Mr. K. Tosch, Manager IV  
Bureau of Nuclear Engineering  
33 Arctic Parkway  
P.O. Box 415  
Trenton, NJ 08625

