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SUBJECT: Forwards proposed amends 188 & 144 to licenses NPF-14 & NPF-22 revising 250 volt dc battery load profiles.

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SUSQUEHANNA STEAM ELECTRIC STATION
PROPOSED AMENDMENTS 188 AND 144 TO
LICENSE NOS. NPF-14 AND NPF-22: CHANGES
TO THE TECHNICAL SPECIFICATIONS TO
REVISE THE 250 VDC BATTERY LOAD PROFILES
PLA-4339 FILE R41-2

Docket Nos. 50-387
and 50-388

The purpose of this letter is to transmit a proposed amendment to the Susquehanna SES Units 1 and 2 Technical Specifications. This proposed change revises the 250 V DC battery load profiles.

BACKGROUND

During a design modification, it was noted that the voltage drop calculations for the Class 1E 250 VDC batteries did not take into account temperature and aging affects. An Engineering Deficiency Report (EDR 93-100) was written to document this condition. As part of the disposition to EDR 93-100, the Class 1E 250 VDC battery load profiles were revised using detailed discrete time segments for battery loading in order to resolve the voltage drop issue. The use of detailed discrete time segments is permitted by IEEE 485-1983. The existing Class 1E 250 VDC battery load profiles did not use the discrete segments for battery loading. The proposed load profiles reflect larger horsepower motors installed due to the Generic Letter 89-10 Project. These larger motors resulted in higher locked rotor amperes. Also Non-Class 1E loads on the Unit 2 250 VDC batteries had been previously removed but the Technical Specifications battery load profiles had not reflected this load reduction.

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DESCRIPTION OF CHANGE

This proposed change revises the Class 1E 250 VDC battery load profiles in Technical Specifications Surveillance 4.8.2.1 (d) (2c) to reflect the new load profile calculations.

Refer to the attached marked up Technical Specifications.

SAFETY ANALYSIS

The Class 1E 250 VDC battery banks consist of 120 Type LCR-25 cells, manufactured by C&D. Each Class 1E 250 VDC battery bank is rated at:

- 120 lead-calcium cells, 12 positive plates per cell, 1800 Ampere-Hours (8 hours to 1.75 V per cell at 77 °F)

The Class 1E 250 VDC batteries supply power for portions of HPCI, RCIC, Main Turbine Emergency Seal Oil Pump, RFPT Emergency Lube Oil Pumps, Reactor Recirc MG Set Emergency Lube Oil Pump, Computer Power Supply Vital AC Power Supply and SPDS Power Supplies.

Main Turbine Emergency Seal Oil Pump, RFPT Emergency Lube Oil Pumps, Reactor Recirc MG Set Emergency Lube Oil Pump, and Computer Power Supply are not considered safety related and do not perform any safety functions. These loads are manually shed per approved operating procedures.

The Vital AC power supply provides power to panel 1Y629. This panel is not considered safety related and does not perform any safety function.

The proposed Class 1E 250 VDC battery load profiles used for the 18 month surveillance testing include the worst case load profiles plus margin. This testing assures that the Class 1E 250 VDC batteries have sufficient stored energy to operate all required emergency loads for four hours after loss of ac power. These profiles also consider the loads that are manually shed by approved operating procedures.

The Class 1E 250 VDC battery load profiles were developed for the following events:

- Large Break LOCA
- Large Break LOCA with HPCI or RCIC in Pressure Control
- Small Break LOCA

- Small Break LOCA with HPCI or RCIC in Pressure Control
- Station Blackout

The load currents and timing for sequencing the loads on the Class 1E 250 VDC batteries were tabulated into discrete time segments for each of the events. The maximum possible load profiles for each event were then developed by determining the maximum loads that could possibly start/operate simultaneously due to changes in the operating times of the connected equipment from the equipment time used to develop the load profiles for each event. Composite battery load profiles were developed using the heaviest loaded discrete time segments from the maximum load profiles for each event. These composite load profiles do not correspond to any single operating mode, however these profiles envelope all the operating modes of the batteries.

Arbitrary margins were added to the composite battery load profiles to establish the proposed Technical Specification Class 1E 250 VDC battery load profiles.

ANSI/IEEE 485-1983 recommends that a battery be replaced when its actual capacity drops to 80% of its rated capacity; therefore the battery rated capacity should be at least 125% of the load expected at the end of service life. The actual loads are multiplied by 1.25 to correct for aging.

C&D battery performance data is based on 77 °F temperature of the electrolyte. The minimum electrolyte temperature at Susquehanna SES may be as low as 60 °F. Per ANSI/IEEE 485-1983 the actual loads are multiplied by 1.1 to correct for 60 °F temperature.

The energy required to be supplied by the Class 1E 250 VDC batteries for the proposed Technical Specifications load profiles and the existing Technical Specification load profiles, corrected for temperature and aging, is:

BATTERY	PROPOSED T.S. AMPERE HOURS	EXISTING T.S. AMPERE HOURS
1D650	525.9	675.8
1D660	1156.2	1639.2
2D650	885.3	1400.8
2D660	899.0	1376.2

Calculations show that the Class 1E 250 VDC batteries can supply the proposed Technical Specifications required Ampere-Hours after correction for temperature and age.

The Class 1E 250 VDC batteries are also required to supply sufficient voltage to maintain 210 VDC at the Class 1E 250 VDC MCCs. The Class 1E 250 circuit design is based upon a minimum of 210 VDC at the Class 1E 250 MCCs to ensure capability is available to supply safety related equipment for (1) the safe shutdown of the facilities and (2) the mitigation and

control of the accident condition within the facilities. Calculations show that the Class 1E 250 VDC batteries maintain at least 210 VDC at the Class 1E 250 VDC MCCs while supplying the proposed Technical Specifications loads, corrected for temperature and aging.

The Class 1E 250 VDC batteries and Class 1E 250 VDC battery chargers have been sized using the proposed Technical Specification load profiles. A calculation shows that the 120 cell, 12 positive plates per cell battery banks are sufficient to supply the proposed Technical Specification load profiles, corrected for temperature and aging. The same calculation also shows that the Class 1E 250 VDC battery chargers have sufficient capacity to re-charge the batteries from the proposed Technical Specification emergency discharge conditions to fully charged condition in 12 hours while continuing to supply the plant normal continuous loads.

NO SIGNIFICANT HAZARDS CONSIDERATIONS

1. **Involve a significant increase in the probability or consequences of an accident previously evaluated.**

   FSAR Section 8.3 states that the station batteries have sufficient capacity without the charger to independently supply the required loads for four hours. The Technical Specifications require that the batteries be surveilled to dummy loads which are greater than the design loads. The load profiles for the 250 VDC batteries were recalculated using discrete increments of time when the loads would be in use for each of five design basis events. The Technical Specification load profiles are a composite of the worst case loads for the events plus margin. The required ampere-hours for each battery using the new load profiles is less than the ampere-hours required using the existing load profiles. Therefore, since the load profiles envelop the actual loads on the batteries, the change to the 250 VDC battery load profiles does not involve a significant increase in the probability or consequence of an accident previously evaluated.

2. **Create the possibility of a new or different kind of accident from any accident previously evaluated.**

   As stated above, the 250 VDC batteries have sufficient capacity to power the actual battery loads thus enabling them to perform their intended function. Any postulated accident resulting from this change is bounded by previous analysis. Therefore, the change to the 250 VDC battery load profiles does not create the possibility of a new or different kind of accident from any previously evaluated.

3. **Involve a significant reduction in a margin of safety.**

The Class 1E 250 VDC batteries are required to have sufficient capacity and capability to ensure sufficient power is available to supply the safety related equipment for (1) the safe shutdown of the facilities and (2) the mitigation and control of accident conditions within the facilities. The proposed load profiles envelope the worst case loads plus margin.

The ampere-hours removed from the Class 1E 250 VDC batteries are less for the proposed load profiles than the existing load profiles. The ampere-hours available in the batteries after the batteries have supplies the emergency loads for 4 hours are:

BATTERY	AMP-HRS REMOVED	AMP-HRS AVAILABLE	AMP-HRS REMAINING
1D650	525.9	1739	1213.1
1D660	1156.2	1656	499.8
2D650	885.3	1704	818.7
2D660	899.0	1704	805

Engineering calculation shows that the Class 1E 250 VDC batteries maintain at least 210 VDC at the Class 1E 250 VDC MCCs while supplying the proposed loads, corrected for temperature and aging. Since the Class 1E 250 VDC circuits are designed to operate properly with a minimum of 210 VDC at the Class 1E MCCs, all the Class 1E emergency equipment supplied from the Class 1E batteries have sufficient voltage to operate for 4 hours after the loss of ac power.

The Class 1E 250 VDC batteries and Class 1E 250 VDC battery chargers have been sized using the proposed load profiles. The Engineering calculation shows that the 120 cell, 12 positive plates per cell battery banks are sufficient to supply the proposed load profiles, corrected for temperature and aging. The same calculation also shows that the Class 1E 250 VDC battery chargers have sufficient capacity to re-charge the batteries from the proposed emergency discharged conditions to the fully charged condition in 12 hours while continuing to supply the plant normal continuous loads.

Base upon the above discussion, the proposed changes to the Technical Specification load profiles do not reduce the margin of safety as defined in the Technical Specifications.

IMPLEMENTATION

Pennsylvania Power & Light Company requests that this change be approved in order to support implementation prior to the Startup following the Ninth Refueling and Inspection Outage on Unit 1 which is scheduled for the Fall of 1996 and prior to the Startup following the Eighth Refueling and Inspection Outage for Unit 2 which is scheduled for the Spring of 1997.

If you have any questions, please contact Mr. C. T. Coddington at (610) 774-7531.

Very truly yours,

R. G. Byram

Attachment

copy: NRC Region I

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