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U. S. NUCLEAR REGULATORY COMMISSION
Document Control Desk
Washington, D.C. 20555

Attention: Mr. David Wagner, Project Manager
Project Directorate III-3

Gentlemen:

DOCKET NOS 50-266 AND 50-301
BATTERY CHARGER INVESTIGATION
POINT BEACH NUCLEAR PLANT

Our Licensee Event Report (LER) 87-004-01 submitted by letter dated November 20, 1987, discussed the corrective actions we had taken to address a voltage stability problem experienced with the battery chargers at our Point Beach Nuclear Plant. This LER was a supplement to LER 87-004-00 which described the loss of the red instrument bus and actuation of the reactor protection system as a result of battery charger induced failures of the instrument bus inverters. The corrective action of LER 87-004-01 concludes that, "It is currently believed that the voltage perturbation may be eliminated by adjustment of the electronic control circuitry associated with the battery chargers. If adjustments will not eliminate the voltage perturbations, modification or replacement of the battery chargers may be considered."

On February 9, 1988, we were contacted by Messrs. Wagner and Saba of your staff regarding our follow up to this LER. We explained that additional testing of the battery chargers, conducted after a larger load bank was made available for testing purposes, had confirmed several circuit and adjustment problems involving the Westinghouse manufactured battery chargers. These problems had resulted in unacceptable DC charger output voltage ripple. Note that an input voltage band of 105 to 140 volts is necessary for satisfactory operation of the inverter. The charger voltage ripple exceeded this band causing the inverters to fail. Your staff requested we provide more detailed information concerning the charger testing and adjustments in this letter.

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After our testing and inspection of the DC battery charges, the following specific corrective actions were taken.

1. Charger D07: Current amplifier integrated circuit was installed improperly. Voltage amplifier stability adjustment was set at 0 ohms.

   Corrective Action: Installed current amplifier integrated circuit properly and adjusted the stability potentiometer to approximately 2800 ohms. Charger was checked at 100 amps and 440 amps loading.

2. Charger D08: SCR gating slightly off. Current limit slightly low.

   Corrective Action: Adjusted potentiometer 17R on the gating board to correct gating problem. Charger was checked at 100 amps and 440 amps loading. Adjusted current limit.

3. Charger D09: Current amplifier integrated circuit not functioning. Voltage amplifier stability adjustment was set to 0 ohms.

   Corrective Action: Replaced the current amplifier integrated circuit and adjusted the stability potentiometer to approximately 2800 ohms. Charger was checked at 100 amps and 440 amps loading.

After completing the corrective action noted, the DC output of the chargers was checked over the loading range from 0 to 440 amperes. Charges D07 and D08 had voltage ripples of less than 3 volts peak to peak and D09 was less than 1 volt peak to peak.

Prior to these charger adjustments, we had conducted testing with charger D09 and inverter DYOA to establish the stability of the inverter output and operation while changing the charger output/inverter input voltage. The charger DC voltage was varied from 105.5 volts to 139.6 volts at approximately 11 HZ. During this input swing, the DYOA inverter maintained a constant frequency output with an amplitude change of + 4.3%. We therefore concluded that since the charger adjustments resulted in DC voltage ripples of less than 3 volts over the entire loading range, the inverters could now be carried by a battery charger alone. Accordingly, no modification of our battery chargers is necessary and we consider our investigation of the matter complete.

Please contact us if you have any additional questions concerning this matter.

Very truly yours,

C. W. Fay
Vice President
Nuclear Power

Copy to NRC Regional Administrator, Region III
NRC Resident Inspector