DUKE POWER COMPANY
P.O. BOX 33189
CHARLOTTE, N.C. 28242

HAL B. TUCKER
VICE PRESIDENT
NUCLEAR PRODUCTION

TELEPHONE
(704) 373-4531

June 8, 1984

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Ms. E. G. Adensam, Chief
Licensing Branch No. 4

Re: Catawba Nuclear Station
Docket Nos. 50-413 and 50-414

Dear Mr. Denton:

My letter of May 31, 1984 provided a revised response to Question 430.110. In the first paragraph of the revised response, "maximum" was incorrectly substituted for "minimum" and has been corrected in the attached response.

Very truly yours,

Hal B. Tucker

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Attachment

cc: Mr. James P. O'Reilly
Regional Administrator
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

NRC Resident Inspector
Catawba Nuclear Station

Mr. Robert Guild, Esq.
Attorney-at-Law
P. O. Box 12097
Charleston, South Carolina 29412

Palmetto Alliance
2135½ Devine Street
Columbia, South Carolina 29205

Mr. Jesse L. Riley
Carolina Environmental Study Group
854 Henley Place
Charlotte, North Carolina 28207

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430.110 Section 10.4.4.1 of the FSAR indicates Catawba can accept up to 100% turbogenerator load reduction without tripping the reactor or main steam relief valve actuation. Since this allows the turbine generator to remain on line powering station loads following a loss of the offsite power system, describe the magnitude and effect of the transient and steady state voltage and frequency output of the main generator on the station loads (especially on Class 1E loads) starting with and following load reduction.

Response:

If the turbine generator is subjected to a 100% load reduction, the maximum voltage on the output of the generator is estimated to be approximately 129% of rated with the period of the excursion where voltage is above 110% of rated being approximately 3.2 seconds. The maximum frequency is estimated to be approximately 107.5% of rated. The minimum values of voltage and frequency do not exceed normal equipment ratings.

Per industry standards, power equipment such as 4 KV switchgear, 4160/600 V transformers, and 600 V switchgear is designed to withstand voltages in excess of 1.4 per unit for a duration of 60 seconds. Motors are typically subjected to hi-pot tests at 2150 volts for 575 volt motors, and 9000 volts for 4 KV motors for a duration of 60 seconds. Based on vendor information and test results, electronic equipment and control components are also capable of withstanding the transient following a 100% load rejection. The frequency excursion would result in a motor speed increase of 7½%; however, NEMA standards require that motors be designed to withstand overspeeds of 20% for short durations without damage.

The value above for maximum voltage is very conservative as it is based on initial conditions where the generator is operating 5% above rated voltage with a power factor of 0.9. Since the Catawba generators have a rated voltage approximately 5% higher than the connected transformers, the generators are not likely to be operated above rated voltage. It is also unlikely that the unit would be operating with a power factor below 0.95. Based on actual operating conditions, the maximum voltage should not exceed 122%.

Although the turbine generator is designed to accept a 100% load rejection, it is extremely unlikely that the unit will be subjected to a 100% load reduction while remaining on line powering station loads. This is especially the case since the unit is tied to the switchyard through two separate circuits which terminate in separate bays of a breaker-and-a-half arrangement.