REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

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AUTH.NAME AUTHOR AFFILIATION
EURY,L.W. Carolina Power & Light Co.
RECIP.NAME RECIPIENT AFFILIATION
VARGA,S.A. Operating Reactors Branch 1

SUBJECT: Forwards "Supplemental Info for Degraded Grid Voltage Analysis," in response to 810131 request re adequacy of electrical distribution sys voltage. 566 B06

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CP&L
Carolina Power & Light Company

October 14, 1982

Office of Nuclear Reactor Regulation
ATTN: Mr. Steven A. Varga, Chief
Operating Reactors Branch No. 1
United States Nuclear Regulatory Commission
Washington, D.C. 20555

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261
LICENSE NO. DPR-23
ADEQUACY OF ELECTRICAL DISTRIBUTION
SYSTEM VOLTAGE - REQUEST FOR ADDITIONAL INFORMATION

Dear Mr. Varga:

SUMMARY

In a letter dated January 13, 1981 you requested additional information regarding the adequacy of the electrical distribution system voltage at H. B. Robinson Unit No. 2 (HBR). During a conference call on March 17, 1981 members of the HBR Staff discussed Carolina Power & Light Company's (CP&L) proposed approach for performing an expanded study of the electrical distribution system voltage with members of your staff. This approach was reiterated in CP&L's letter to your office dated June 17, 1981, and confirmed by you in a letter to CP&L dated July 6, 1981. The enclosed report, prepared by Ebasco Services Company for CP&L, provides the results of this study and the requested additional information.

DISCUSSION

This report contains two fundamental exceptions to the NRC positions. These relate to the use of a postulated grid system voltage range of 0.95 to 1.06 pu and the use of motor nameplate horsepower ratings.

An NRC letter dated August 12, 1976, from R. W. Reid to J. A. Jones, enclosure No. 2, question 1b, requested the definition of the normal operating range of the grid system voltage. Our reply of February 17, 1977 stated in response that the grid system voltage range was 0.95 to 1.06 pu. Subsequent correspondence to the NRC stated a more accurate grid system voltage range of 0.97 to 1.01 pu, which remains valid today and is consistent with guideline 6 of the NRC letter dated August 8, 1979, to all power reactor licensees, from William Gammill, which provided additional guidelines for voltage drop calculations.

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Carolina Power & Light Company recognizes that the extreme hypothetical limits of 0.95 and 1.06 pu are not expected to be reached in the actual operation of the plant; however, by NRC direction, we have used this postulated range for the analyses presented in the enclosed report.

Your staff also requested that nameplate horsepower ratings be used for large and medium sized motors. However, we believe that to approximate as closely as possible maximum operating conditions, the "design point" brake horsepower for all large and medium size equipment listed in the FSAR should be assumed as the load on the driven equipment. Therefore, when available, design point brake horsepower was obtained from speed-torque characteristic curves and when not available, the nameplate horsepower of the motor was used. It has been observed and recorded during September 1976, February 1982, and August 1982 that the running load of the large and medium size equipment was, on the average, approximately 10 percent below the design point brake horsepower. For example, the Steam Generator Feed Pump was tested during normal full load operation and on these occasions the results were consistent; the normal full load operating brake horsepower measured was 3860, the calculated design point brake horsepower was 5428, and the motor nameplate horsepower is 6000. A 29% margin between normal full load brake horsepower and design point brake horsepower is realized. Thus, CP&L is assured that this approach provides inherent margin of safety in the calculated values. The use of design point brake horsepower more closely approximates the plant operation as the nameplate horsepower represents the capacity of the motor and not the maximum capacity of the driven equipment.

RESULTS

Using the guideline limits of 0.97 to 1.01 pu results in acceptable maximum and minimum bus voltages to achieve motor starting and running characteristics as well as contactor pickup at all buses. Motor Control Centers No. 5 & 6 are marginal but acceptable due to the conservatism built into the analyses. Conservatisms present are; no credit taken for load shedding which will occur after initiation of a LOCA; and use of design point brake horsepower results in load values at least 10 percent above actual load. However, to ensure improvement of these analyzed marginal voltages, CP&L will change the tap settings on station service transformers A, B, C, and D. This will increase the secondary voltages at the safety buses by 2.5 percent. The recommended tap changes will be performed at the plant during the steam generator inspection outage presently scheduled for March of 1983.

Due to the NRC expanded requirements and refinements in the computer calculations using actual power factors, efficiencies, and locked rotor amps in lieu of assumed values, the complete distribution system was reanalyzed. Therefore, this submittal supersedes the October 3, 1976 report.

If you have any further questions regarding this matter, please contact a member of my staff.

Yours very truly,

L. W. Eury
Senior Vice President
Power Supply

DCW/lr (4450C6T6)
Enclosure

cc: Mr. J. P. O'Reilly (NRC-RII)
Mr. G. Requa (NRC)