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RECIP.NAME RECIPIENT AFFILIATION
VARGA,S.A. Operating Reactors Branch 1

mA/4

SUBJECT: Forwards addl info re degraded grid voltage protection,per NRC 800905 request.Tech Spec revisions requested in Item 4 of ltr are currently under in-plant & corporate ofc review. One oversize drawing encl.

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DRAWINGS

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dJ

WISCONSIN PUBLIC SERVICE CORPORATION

P.O. Box 1200, Green Bay, Wisconsin 54305

October 14, 1980

Mr. Steven A Varga, Chief
Operating Reactors Branch #1
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Varga:

Docket 50-305
Operating License DPR-43
Letter from Mr. Varga to Mr. E. R. Mathews
dated September 5, 1980

Enclosed is the additional information requested in the referenced letter in response to Degraded Grid Voltage Protection. This information is being sent in accordance with 10 CFR 50.54(f).

Item 4 of your letter requests revised Technical Specifications on this matter. These specifications are currently under in-plant and corporate office review. After appropriate review as required by existing Technical Specifications and Administrative Procedures, this Amendment will be sent to your offices for approval. We expect this submittal to be made by mid-November.

In regard to your request for additional information regarding the Adequacy of Station Electric Distribution System Voltages transmitted August 21, 1980, in a letter from Mr. Varga to Mr. E. R. Mathews, our staff is still preparing a response. Investigation was in progress in response to that request when the referenced letter was received. Since the response to this letter was

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8010210502 P

requested under 10 CFR 50.54(f), we established this response as higher priority. We expect to transmit a response to your August 21, 1980, request by the end of November.

Very truly yours,

E. R. Mathews

E. R. Mathews, Vice President
Power Supply & Engineering

snf

Enc.

cc - Mr. Robert Nelson, NRC Resident Inspector
RR #1, Box 999
Kewaunee, WI 54216

Subscribed and Sworn to
Before Me This 14th Day
of October 1980

Notary Public, State of Wisconsin

My Commission Expires
10-31-83

ATTACHMENT

1. In response to your request for design details concerning undervoltage protection to the safeguard buses, we are providing the following information.

   A. 4160 Volt Emergency Bus Undervoltage protection from Loss of Voltage consists of two channels per bus. Each channel consists of 1 undervoltage relay set at 87.5% of 4160 volts with no time delay and one relay set at 87.5% of 4160 volts with a one second time delay. Logic diagram details are shown in Figure 237127A - E 1634, enclosed for your information.

   A trip setting value of greater than 80% of nominal bus voltage ensures that voltage is restored promptly to the affected safeguards bus in a loss of power event. A time delay of 1 second ensures that spurious trips will not occur due to channel spikes. A time delay of less than 2 1/2 seconds is required to assure that the safety injection sequence will proceed as described in the FSAR, Section 8, with the diesel generators at full capacity before the safety injection pumps start. The logic shown in Figure E 1634 ensures that instrument drift will not result in a spurious bus supply transfer to the non-preferred choice, because no single instrument drift or failure will initiate the loss of voltage actuation.

   B. A second independent set of Emergency Bus Undervoltage relays providing protection from degraded voltage conditions has been installed. This protection consists of 2 separate 6 second time delay relays with trip settings at 95% of nominal bus voltage that must both be actuated in order to initiate loss of voltage actuation. The loss of voltage signal is then delayed 30 minutes before the bus is stripped and the voltage

restoring scheme commenced. If either of the two relays trip due to relay drift or for degraded voltage reasons, an annunciator alerts the operator to take corrective action. If voltage truly is degraded, the operator is instructed to attempt to restore voltage by shedding unnecessary loads. Logic details for degraded voltage protection are shown in Figure 237127A E 1634.

A value of greater than 94.5% of nominal bus voltage ensures that all engineered safeguards pumps and motors will have greater than 90% of name plate rated voltage. All safety related pumps and motors at Kewaunee were purchased to be able to start and run continuously at 80% of nameplate rated voltage, however, rather than try to justify and provide documentation that all electrical equipment can be run at that degraded voltage, the national electrical standard of 90% was chosen as the minimum acceptable for the analysis. The time delay of 6 seconds coincident with 95% of nominal bus voltage ensures that short term voltage dips will not result in spurious control room annunciation. The 30 minute delay in actuation allows the control operators time to attempt to restore bus voltage by shedding unnecessary loads and re-aligning necessary safeguard loads for long term protection of pumps and motors. The logic requires both relays to sense an undervoltage condition prior to undervoltage actuation thus providing protection against spurious trips caused by instrument drift.

2. The basis of your concern for requiring maximum limits for undervoltage settings on loss of power and degraded grid undervoltage protection is stated as a safety concern to prevent the spurious tripping of the off-site power source due to relay setpoint drift. The maximum limit requirement is not consistent with other Technical Specification safeguard setpoints where

protection from spurious tripping due to instrument drift is provided by coincident circuitry, i.e., coincident actuation of more than one instrument channel is required to perform the trip, e.g., 2/4 logic. In the logic described in item 1 above, adequate protection from spurious trips is provided by 2 out of 4 and 2 out of 2 coincident logic for the undervoltage protection actuation signals. Based on six years of operating experience we have found that relay setpoint drift averages less than 0.5% during the surveillance period intervals. Annunciation is provided when any single undervoltage relay is tripped thus warning the operator of potential problems due to degraded voltage or relay setpoint drift. Thus we conclude that the spurious trip concerns implied within the requirements of GDC 17 are satisfied.

3. The voltage restoring relays referred to in your question No. 3 are Class IE electrical equipment located in the same safeguard protection racks, and are calibrated in accordance with the same surveillance procedures as the undervoltage relays. The purpose of these relays is to allow selection of an alternate source of offsite power for the safeguard buses should proper voltage be available on the redundant offsite power source. These relays do not affect the capability of diesel generator loading to the safeguard buses in the event of a loss of offsite power. Although providing increased reliability of the offsite power source, these relays do not perform a required safety function and should not be referenced in the Technical Specifications.

4. Technical Specifications (proposed Amendment No. 29) in regard to undervoltage protection were submitted to the NRC on August 4, 1977. These Technical Specifications upgraded the protection provided for the Kewaunee Plant engineered safeguard electrical distribution system. Although these Technical Specifications have not been approved by the staff we have

implemented the proposed specifications. We are currently revising that proposed amendment to include protection from long term degraded grid conditions and expect to submit those Technical Specifications for your review by mid-November of this year.

Maximum limits to the undervoltage and degraded grid voltage trip setpoints are not necessary since we have provided protection against spurious actuation caused by instrument drift through the use of coincident logic. Furthermore, our operating experience with the relays used in our undervoltage and degraded voltage protection logic has shown that setpoint drift is of minimal concern.