REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:8202080292 DOC.DATE: 82/02/01 NOTARIZED: YES DOCKET #
FACIL:50-305 Kewaunee Nuclear Power Plant, Wisconsin Public Servic 05000305
AUTH.NAME AUTHOR AFFILIATION
MATHEWS,E.R. Wisconsin Electric Power Co.
RECIP.NAME RECIPIENT AFFILIATION
VARGA,S.A. Operating Reactors Branch 1

SUBJECT: Requests that effective date of Amend 29b to License DPR-43 be delayed until after 820601 to permit mod to time delay setpoint re proposed Tech Specs for degraced grid conditions.

DISTRIBUTION CODE: A015S COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 613
TITLE: Onsite Emergency Power Systems

NOTES:I&E:3 copies all material. 05000305

	RECIPIENT ID CODE/NAME		COPIES LTTR	COPIES ENCL	RECIPIENT ID CODE/NAME		COPIES LTTR	COPIES ENCL
ACTION:	ORB #1 BC	01	7	7				
INTERNAL:	AEOD		1	1	ELD	17	1	1
	IE	06	2	2	MPA	18	1	1
	NRR/DL/ORAB	12	1	1	NRR/DSI/CSB	09	1	1
	NRR/DSI/PSB	14	1	1	REG FILE	04	1	1
EXTERNAL:	ACRS	16	10	10	INPO,J.STARNES		1	1
	LPDR	03	1	1	NRC PDR	02	1	1
	NSIC	05	1	1	NTIS		1	1

MA
4

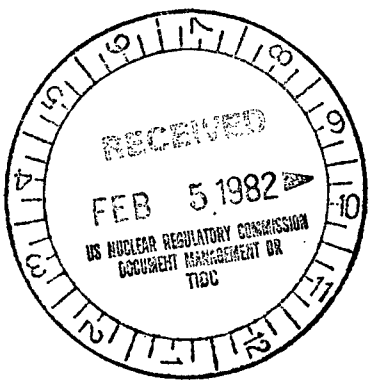
TOTAL NUMBER OF COPIES REQUIRED: LTTR 34 ENCL 34

26

NRC-82-19

WISCONSIN PUBLIC SERVICE CORPORATION

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



February 1, 1982

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
Kewaunee Nuclear Power Plant
Degraded Grid Proposed
Technical Specification Amendment #29b

Reference: Letter from Mr. E. R. Mathews to Mr. S. A. Varga dated May 1, 1981

The above referenced letter transmitted proposed Amendment No. 29b to the Kewaunee Nuclear Power Plant Technical Specifications. This Proposed Amendment included a time delay setpoint of 30 minutes for the second level under-voltage protection on the two 4160 volt safety related buses at the Kewaunee Plant. The 30 minute value was chosen based on engineering judgment as not long enough to adversely affect safety related motors and yet give sufficient time for corrective load shedding.

The 30 minute value was discussed during our October 14, 1981, meeting with our Project Manager and the degraded grid technical reviewers in Bethesda, Md. During this meeting it was concluded that a 30 minute delay is acceptable provided the Thermal Overload Relays (motor heaters) will operate satisfactorily.

A015
S 1/1

Accordingly, an evaluation of the motor heaters was performed to determine the effect of operation at degraded grid conditions for prolonged periods. Analysis indicates the majority of the presently installed heaters will prevent motor operation at some time less than 30 minutes, prior to automatic loading of the diesel generators. To rectify this situation a large number of the heaters would have to be replaced. The same analysis indicates that far fewer heaters would require replacement if a 5 minute delay is assumed. Therefore, it is cost effective to set the time delay at 5 minutes and adjust or replace presently installed heaters as needed, rather than retain the 30 minute delay.

As inferred above, a conservative analysis indicates that several heaters will perform their trip function within five minutes. To determine a more realistic estimate of the capability of the heaters a less conservative analysis was performed. Ths analysis is discussed in the attachment to this letter. Based upon this analysis, 6 heaters which would trip within 5 minutes were identified. Four of these heaters are asssociated with motor operated valves and are not a concern as the stroke time of the valve is less than the trip time due to heater function.

There are two fan motors which will trip before five minutes if the motor heater is not adjusted or replaced. The battery rooms exhaust fan will operate for over four minutes before tripping. The function of this fan is to remove hydrogen generated during battery charging. Since the batteries would be discharging during this period, there will be no hydrogen accumulation and thus no concern.

The fan supplying combustion air to the 1B diesel generator would originally run for slightly over four minutes before tripping, given a degraded grid. The motor heater has now been adjusted to allow this fan to operate for longer than five minutes, thus allowing a transfer to an alternate power source before the point of tripping the fan motor.

The time delay for automatic action given a degraded grid of 87.5% is set at 30 minutes (consistent with our original intent). Until the time delay can be reset to 5 minutes, the operators have been instructed to bring the diesel generators up to speed and trip the safety related buses within 5 minutes in the event of a degraded grid. This will cause a fast transfer of safety relaed loads to the diesel generators. The procedure governing this transfer is entitled 'Operator Action for Degraded Voltage on Buses 1-5 and 1-6' dated 12-23-81.

Based on this procedure and our realistic analysis, the Kewaunee Plant is capable of successfully responding to degraded grid conditions. However, to fully satisfy the staffs concerns with respect to degraded grid conditions, further changes must still be made at the plant to satisfy the assumptions of the conservative analysis which was noted above. Since the licensing basis for the Kewaunee Plant assumes that the degraded voltage occurs quickly and castastrophically, and a prolonged grid degragration above the 'Blackout' value is an additional issue, and finally since the Kewaunee Plant can respond to a degraded grid condition, it is appropriate to make the final changes on an orderly schedule. The changes which must be made include heater adjustment and replacement and changing the time delay setpoint to 5 minutes less the tolerance of the relay.

The engineering on the proper heater sizing is currently in progress. The heater sizing will be completed by the middle of February, 1982. This will define which heaters need to be replaced and those which only need adjustment. Adjustments and replacements will be completed during the 1982 refueling outage.

The modification of the time delay setpoint requires that a new time delay relay be installed. Based on a six to eight week delivery time this change will also be made during the 1982 outage. The change in the time delay setpoint has been made to page TS 3.5-5 and Table TS 3.5-1 of Proposed Technical Specification No. 29b. This change has been highlighted by a double revision bar. Forty (40) copies of the above referenced pages are enclosed to replace those sent to you on May 1, 1981. The Proposed Technical Specification Amendment number will remain No. 29b.

Based on the above implementation schedule we request that the effective date of the amendment be delayed until on or after June 1, 1982.

Very truly yours,

E. R. Mathews

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

jfp

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

Subscribed and Sworn to
Before Me This 1st Day
of February 1982

Notary Public, State of Wisconsin

My Commission Expires:
March 24, 1985

Attachment to Letter Dated
February 1, 1982 from E. R. Mathews (WPSC)
to S. A. Varga (NRC)

This attachment provides the basis for our conclusion that the currently installed thermal overload relays (motor heaters) on safety related equipment will not perform their trip function until after five minutes following a degraded grid condition.

Given specific assumed grid conditions, the heater performance is based on the limiting value of either the starting amps (short term) or the running amps (long term). The heater performance can be estimated using Figure 1, Thermal-Overload Relays - Time-Current Curves.

Starting Amps

The largest of the motors of concern are nominally 460 V motors. All motors of this size and smaller can reasonably be expected to start within 8 to 10 seconds. Figure 1 shows that if the ratio of starting amps to full load amps is less than 10, the motor will start. Table 20-11 and equation 20-51 in "The standard Handbook for Electrical Engineers" show that the starting amps at 460 V can be determined by the equation:

$$I_S = \frac{\text{Table Start Amps}}{\text{Table Full Load Amps}} \times \frac{230\ V}{460\ V} \times I_{FL}$$

Where I_S = Starting Amps
I_{FL} = Full Load Amps

Using this method, it has been determined that the presently installed heaters will allow all of the motors of concern to start (i.e. the ratio $I_S/I_{FL} < 10$). Therefore, the full load running amps is the limiting value in determining heater performance.

Running Amps

To estimate heater performance under full load amps and degraded grid conditions, nominal grid conditions are first used to determine the initial coordinates on Figure 1. Since it is known that all of the motors will start and run indefinitely at nominal conditions, we can assume that this corresponds to the range of multiples of current of about 0.93 to 1.1 at 900 seconds on Figure 1.

Under degraded grid conditions (assuming 85.5% of nominal voltage), the full load amps of a given motor will increase by a factor of aproximately 1.16. Figure 1 shows that increasing the multiple of current by this factor will result in run times greater than 300 seconds (5 minutes). Therefore, based on this realistic analysis, all currently installed heaters will permit motor operation for at least 5 minutes under degraded grid conditions.

Attachment to Letter Dated
February 1, 1982 from E. R. Mathews (WPSC)
to S. A. Varga (NRC)

Nominal Heater Sizing

Normally, motor heater size is based on manufacturers nameplate rating for the motor and standard heater tables. The conservatisms present in both of these factors have resulted in several cases at KNPP where an analysis using standard heater sizing techniques indicates that several heaters will prevent motor operation within five minutes at degraded grid conditions.

The specific heaters will be replaced with appropriate sized heaters during the 1982 refueling outage.

FIGURE 1
THERMAL - OVERLOAD RELAYS
TIME - CURRENT CURVES