NRC FORM 195 (2-76)

U.S. NUCLEAR REGULATORY COMMISSION

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DOCKET NUMBER	50-263
FILE NUMBER	

TO: Mr. D. L. Ziemann	FROM: Northern States Power Company, Minneapolis, Minnesota, L. O. Mayer	DATE OF DOCUMENT	3/4/77
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DESCRIPTION

Ltr. re our 8/13/76 ltr...furnishing supplemental information concerning equipment performance under degraded voltage conditions.....

ENCLOSURE

ACKNOWLEDGED

DO NOT REMOVE

PLANT NAME: Monticello (3-P)

SAFETY — FOR ACTION/INFORMATION — ENVIRO 3/10/77 — RJL

	ASSIGNED AD:			ASSIGNED AD:
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CONTROL NUMBER

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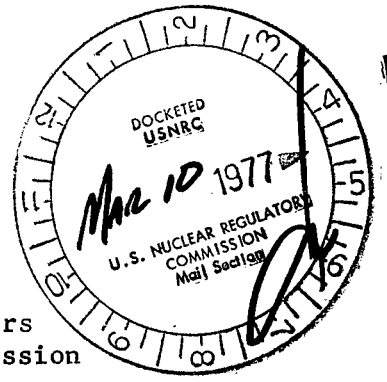
NRC FORM 195 (2-76)

NSP

NORTHERN STATES POWER COMPANY

MINNEAPOLIS, MINNESOTA 55401



Regulatory Docket File

March 4, 1977

Mr D L Ziemann, Chief
Operating Reactors Branch #2
Division of Operating Reactors
U S Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr Ziemann:

MONTICELLO NUCLEAR GENERATING PLANT
Docket No. 50-263 License No. DPR-22

Supplemental Information Concerning Equipment
Performance Under Degraded Voltage Conditions

In your August 13, 1976 letter, you asked us to conduct an investigation of our facility to determine if we are susceptible to a Millstone type low grid voltage event. A formal report of this investigation was submitted on September 17, 1976. This reported stated that further investigation was continuing in the following areas:

a. Precise determination of the voltage range over which safety related components and non-safety related components can operate continuously in the performance of their function.

b. Determining if the voltage variations on the safeguards busses due to worst case grid or generator voltage fluctuations and plant loading lie within the acceptable band defined in (a) above.

c. Proposed changes or plant modifications to assure that acceptable voltages will exist on safeguards busses under all conditions of voltage fluctuation and plant loading. This includes procedural changes or modifications to protect the plant in the unlikely event safeguard bus voltages fall to just above the under voltage trip setting.

The purpose of this letter is to report the progress of continued investigations in this area and to describe our proposed actions and modifications to assure that adequate voltages will be present under all conditions on the safety related busses.

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Item (a), Determination of Range of Acceptable Voltages

Motor Control Centers (MCC's)

Testing is now in progress to measure the minimum pickup voltage of safety related MCC contactors. This testing will be substantially completed by April 1, 1977. Some testing, however, must be scheduled for the 1977 autumn outage. Preliminary test results indicate that minimum pickup voltages are less than 400 volts. Earlier calculations based on conservative methods indicated that pickup voltages were significantly higher.

Motors

Safety related motors on the 480 volt busses are rated at 440 and 460 volts. Safety related motors on the 4160 volt busses are rated at 4000 volts. The acceptable ± 10% operating ranges are therefore:

Bus	Minimum Voltage	Maximum Voltage
480 V	414 V	484 V
4160 V	3600 V	4400 V

Final station auxiliary power voltage limits will be established when the MCC pickup voltage measurements are completed. If, as expected, MCC pickup voltages are not the limiting factor in determining these limits, limits dictated by motor requirements will be adopted.

Item (b), Comparing Worst Case Voltage Variations to Range of Acceptable Voltage

This comparison will be made after the MCC pickup voltage measurements are completed. If the MCC pickup voltages are not limiting, the range of acceptable voltages becomes 414 to 484 volts on the 480 volt busses and 3600 to 4400 volts on the 4160 volt busses as noted above. Assuming this is the case, referring to Items (1c) and (1d) in our September 17, 1976 report shows that acceptable minimum voltages are provided under worst case conditions with the existing transformer taps. Under conditions of maximum expected grid voltage and zero load (a condition which cannot be physically achieved), the maximum voltage limits are exceeded somewhat. When significant load is applied, however, these voltages will fall to acceptable values. Transformer tap setting changes are being considered to optimize the range of voltages on safety related busses due to worst case grid voltage variations.

As noted in our September 17, 1976 report, no motors or contactors will operate correctly if grid voltage is assumed to deteriorate to the point where the undervoltage trip setting of the safeguard busses is reached.

Item (c), Proposed Changes or Plant Modifications

To provide assurance that the voltages supplied to safety related loads remain within allowable ranges we will improve our bus voltage monitoring capability

and provide high-low alarms on offsite supply busses, the generator outputs, and on the safety related 4160 volt busses.

As now envisioned, the proposed alarm system will include:

1. 345 Kv bus voltage monitored by computer or undervoltage relays with high-low set points to alarm when bus voltage leaves the normal operating range.

2. 115 Kv bus voltage monitored by computer or under voltage relays with high-low set points to alarm when bus voltage leaves the normal operating range. This voltage is regulated by an automatic load tap changer.

3. Generator terminal voltage monitored by computer with high-low set points set at rated generator voltage plus and minus five percent. This corresponds to the allowable voltage operating range of the generator.

4. 4.16 Kv station safeguard bus voltages monitored by computer or undervoltage relays with high-low set points to alarm when voltage on the bus leaves the allowable operating range.

With proper station auxiliary transformer tap settings, maintaining proper substation bus voltages and generator terminal voltages will ensure that the station auxiliary voltages are acceptable. Should a disturbance create a low voltage condition which cannot be immediately corrected by plant operators or the system dispatcher, the station auxiliary bus voltage alarms will alert the plant operator that action is required to protect station auxiliary equipment from excessively high or low voltages. In the event other corrective actions fail to restore voltages to the normal operating range, the unit will be tripped and safety related loads will be carried by the diesel generators. Corrective actions will be outlined in written procedures.

The proposed upgraded monitoring and alarm system will be completed during the 1977 autumn outage. Necessary changes to operating procedures will be completed by the end of the outage.

Contact us if you have any additional questions concerning the potential for improper voltages or the actions we have taken to provide additional assurance that the problem will not be encountered at our facility.

Yours very truly,

L. O. Mayer

L O Mayer, PE
Manager of Nuclear Support Services

LOM/DMM/deh

cc: J G Keppler
G Charnoff
MPCA
Attn: J W Ferman