



Northern States Power Company

414 Nicollet Mall
Minneapolis, Minnesota 55401-1927
Telephone (612) 330-5500

April 14, 1993

Report Required by
10 CFR Part 50, Section 50.73

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

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

Bus Transfer Due to High Diesel Generator
Voltage Caused By Inadequate Information

The Licensee Event Report for this occurrence is attached. This report contains no new NRC commitments.

Please contact Terry Coss, Sr Licensing Engineer, at (612) 295-1449 if you require further information.

Roger O Anderson
Director
Licensing and Management Issues

c: Regional Administrator - III NRC
Sr Resident Inspector, NRC
NRR Project Manager, NRC
State of Minnesota,
Attn: Kris Sanda

Attachment

200013

JK27

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 70.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MMRB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) Monticello Nuclear Generating Plant										DOCKET NUMBER (2) 05000 263			PAGE (3) 1 OF 4	
TITLE (4) Bus Transfer Due to High Diesel Generator Voltage Caused By Inadequate Information														
EVENT DATE (5)			LER NUMBER (6)			REPORT NUMBER (7)			OTHER FACILITIES INVOLVED (8)					
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME			DOCKET NUMBER		
02	15	93	93	005	00	04	14	93	FACILITY NAME			DOCKET NUMBER		
												05000		
												05000		
OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more) (11)												
N		20.402(b)			20.405(c)			50.73(a)(2)(iv)			73.71(b)			
POWER LEVEL (10)		20.405(a)(1)(i)			50.36(c)(1)			50.73(a)(2)(v)			73.71(c)			
0.0%		20.405(a)(1)(ii)			50.36(c)(2)			50.73(a)(2)(vii)			X OTHER			
		20.405(a)(1)(iii)			50.73(a)(2)(ii)			50.73(a)(2)(viii)(A)			(Specify in Abstract below and in Text, NRC Form 388A)			
		20.405(a)(1)(iv)			50.73(a)(2)(iii)			50.73(a)(2)(viii)(B)						
		20.405(a)(1)(v)			50.73(a)(2)(iii)			50.73(a)(2)(x)						
LICENSEE CONTACT FOR THIS LER (12)														
NAME Steve Engelke, Supt Electrical & IC Engineering										TELEPHONE NUMBER (include Area Code) 612-295-1329				
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)														
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRRDS				
SUPPLEMENTAL REPORT EXPECTED (14)										EXPECTED SUBMISSION DATE (15)		MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)										X NO				
ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)														
<p>While in cold shutdown for a refueling outage, the 480 Volt LPCI (Low Pressure Coolant Injection) Swing Bus transferred to the alternate power supply during the once per cycle simulated automatic actuation test of the Emergency Core Cooling Systems. The LPCI swing bus transferred due to a sensed over-voltage condition on the primary power supply. The cause of this event was lack of adequate detailed information concerning the Emergency Diesel Generator voltage regulator and governor characteristics which lead to inadequate voltage setting. The LPCI Swing bus was transferred back to the normal power source, the Emergency Diesel Generator surveillance procedure was revised, and additional information on operation of the voltage regulator has been obtained and included in the Emergency Diesel Generator technical manual. This is a voluntary report submitted because of possible generic interest.</p>														

**LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION**

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBR 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Monticello Nuclear Generating Plant	05000 263	93	- 005 -	00	2 OF 4

TEXT (If more space is required, use additional copies of NRC Form 306A) (17)

DESCRIPTION

On March 15, 1993, at 1816 hours, while in cold shutdown for a refueling outage, the 480 Volt LPCI (Low Pressure Coolant Injection) Swing Bus transferred to the alternate power supply during the once per cycle simulated automatic actuation test of the Emergency Core Cooling Systems (ECCS)(0036-2).

The test gives a loss of normal electrical power to the Essential 4160 Volt (EIIIS System: EB) bus with a simulated automatic start signal for the low pressure ECCS pumps. The #11 Emergency Diesel Generator (EIIIS Component: DG) started and restored power to the Essential bus as designed, but the initial voltage on the bus was significantly higher than desired. When the first ECCS pump started the bus voltage and the Emergency Diesel Generator speed initially decreased and then recovered with some overshoot. The voltage overshoot was sufficient to initiate the bus over-voltage relay resulting in a transfer of the LPCI Swing bus to the alternate source. The LPCI Swing Bus was transferred back to the normal source.

The event is being reported voluntarily because it may be of generic concern.

CAUSE

The cause of this event was lack of adequate detailed information concerning the Emergency Diesel Generator voltage regulator characteristics. In particular, regulator sensitivity to changes in frequency was not clearly identified.

When the emergency buses are powered by the Emergency Diesel Generators, an ECCS pump start results in an initial decrease in voltage and speed which is then partially recovered by the action of the voltage regulator and engine speed governor. During the recovery there is some transient overshoot. The voltage regulator and speed governor setpoints must be set to insure sufficient voltage and frequency are maintained during and following the automatic starting sequence for emergency loads. This is accomplished by setting the no-load voltage and speed near the high end of the allowable band.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Monticello Nuclear Generating Plant	05000 263	93	- 005 -	00	3 OF 4

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

To insure adequate and consistent voltage, the Emergency Diesel Generator surveillance procedure was revised on December 4, 1992, to specify an as-left voltage regulator setting which provided 4300 volts at 60 hertz with the generator output breaker open. Information available at that time did not indicate the voltage regulator sensitivity to frequency. It was therefore not recognized that the as-left setting would result in an over-voltage condition during an automatic initiation which results in a frequency of 62.5 hertz. It is now known that the magnetic amplifier portion of the regulator exhibits a change in setpoint proportional to frequency.

During monthly surveillance testing, the Emergency Diesel Generator is started at reduced speed and controlled at 60 hertz by the operator. Therefore, the condition was not discovered until the automatic starting and loading test which is performed during refueling outages.

ANALYSIS

During an automatic start the engine governor is set to the high speed limit. At that governor setting the characteristics of the voltage regulator result in bus voltage of about 4500 volts. The overshoot during the transient for the first ECCS pump star reached a peak of 4640 volts. Due to the limited magnitude and duration of the over-voltage condition, no equipment damage resulted and no significant degradation should have occurred.

The transfer of the LPCI swing bus to the alternate emergency bus operated as designed. The transfer does not cause any equipment to be inoperable or present a risk to public health and safety. This event is being reported voluntarily because it may be of generic interest.

CORRECTIVE ACTIONS

The following actions have been completed:

1. The LPCI Swing bus was transferred to the normal power source.
2. The Emergency Diesel Generator surveillance procedure was revised to set the no load voltage to 4300 volts at the engine high speed stop (approximately 62.5 hertz).

LICENSEE EVENT REPORT (LER)
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Monticello Nuclear Generating Plant	05000 263	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	4 OF 4
		93	005	00	

TEXT (If more space is required, use additional copies of NRC Form 365A) (17)

3. Additional information on operation of the voltage regulator has been obtained and included in the Emergency Diesel Generator technical manual.

ADDITIONAL INFORMATION

Failed Component Identification

None

Previous Similar Events

None