



Northern States Power Company

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December 9, 1992

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

Non-Safety Related Relays Could Prevent Both Emergency Diesel
Generators From Performing Their Intended Function Due to Inadequate Design

The Licensee Event Report for this occurrence is attached. Please contact us if
you require further information.

TE Com for

Thomas M Parker
Director of Licensing
Nuclear Generation

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

Attachment

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PDR ADOCK 05000263
S PDR

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LICENSEE EVENT REPORT (LER)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (F530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, 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) 0 5 0 0 0 2 6 3 1 OF 16																																							
TITLE (4) Non-Safety Related Relays Could Prevent Both Emergency Diesel Generators From Performing Their Intended Function Due to Inadequate Design																																																	
EVENT DATE (5)						LER NUMBER (6)				REPORT DATE (7)						OTHER FACILITIES INVOLVED (8)																																	
MONTH			DAY			YEAR			YEAR		SEQUENTIAL NUMBER		REVISION NUMBER		MONTH			DAY			YEAR			FACILITY NAMES				DOCKET NUMBER(S)																					
1			1			0			9			9		2		0		1		7		0			0			1			2			0			9			9			2			0 5 0 0 0			
OPERATING MODE (9) N						THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §. (Check one or more of the following) (11)																																											
POWER LEVEL (10) 0.915						20.402(b)				20.405(c)				50.73(a)(2)(iv)				73.71(b)																															
						20.405(a)(1)(ii)				50.38(a)(1)				50.73(a)(2)(v)				73.71(a)																															
						20.405(a)(1)(iii)				50.38(a)(2)				50.73(a)(2)(vi)				OTHER (Specify in Abstract below and in Text, NRC Form 366A)																															
						20.405(a)(1)(iii)				50.73(a)(2)(iii)				50.73(a)(2)(viii)(A)																																			
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LICENSEE CONTACT FOR THIS LER (12)																																																	
NAME										TELEPHONE NUMBER																																							
Larry Hauth, System Engineer										6 1 2 2 9 5 - 1 4 4 4																																							
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																																																	
CAUSE		SYSTEM		COMPONENT		MANUFACTURER		REPORTABLE TO NRC		CAUSE		SYSTEM		COMPONENT		MANUFACTURER		REPORTABLE TO NRC																															
SUPPLEMENTAL REPORT EXPECTED (14)										EXPECTED SUBMISSION DATE (15)																																							
YES (If yes, complete EXPECTED SUBMISSION DATE)										X NO																																							

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

During the performance of a routine surveillance a "Maintenance Lockout" alarm was received for #12 Emergency Diesel Generator. Investigation of the alarm determined that a specific failure mode (i.e. short circuit) in a non-safety related relay in each Emergency Diesel Generator control panel could prevent the Emergency Diesel Generator from performing its intended function. Since the circuit design is identical for each Emergency Diesel Generator, both were declared inoperable and Technical Specification 3.9.B.3.b was entered. The relay in each control panel was disconnected to prevent interference with Emergency Diesel Generator operation, a safety evaluation was completed to justify operation without the relay, and operating procedures were revised to require increased frequency of operator rounds to monitor Emergency Diesel Generator control power breakers. Both Emergency Diesel Generators were then declared operable. The cause of this event was modification process deficiency. The modification process has been revised to specifically address non-safety interfaces with safety related equipment. A modification will be completed to restore the alarm function.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN FOR RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNB 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 (4)			PAGE (3)
MONTICELLO NUCLEAR GENERATING PLANT		05000 263		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 OF 6
				92	017	00	

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

DESCRIPTION

On November 9, 1992, at 0255 hours with the plant operating at 94.5% of rated thermal power, a routine surveillance procedure was initiated for #12 Emergency Diesel Generator (EIGS Component: DG). Near the completion of the surveillance a local "NOT AUTO" alarm and a Control Room (EIGS System: NA) "Maintenance Lockout" alarm for #12 Emergency Diesel Generator were received although the diesel continued to function normally. The alarm was the result of a failure in the No Voltage Alarm circuit. In the process of locating the needed spare parts it was necessary to confirm the original design basis for this alarm circuit. Investigation by plant engineers identified that the Emergency Diesel Generator annunciator circuit configuration was such that a specific failure mode (i.e. short circuit) of the No Voltage Relay (NVR) (EIGS Component: RLY) could prevent the Emergency Diesel Generator from performing its function. This relay monitors power fed through one pole of each of the safety related Emergency Diesel Generator control/logic power breakers and provides an alarm in the Control Room if any of the local control power circuit breakers are open (See Figure 1, attached). An overcurrent caused by a failure of the non-safety related NVR relay could trip open one of the breakers resulting in a loss of remote control and/or automatic starting capability of the Emergency Diesel Generator. This failure potential requires that the relay be classified as safety related. However, a search of the documentation identified that the relay was procured non-safety related.

An identical annunciator circuit with a non-safety related NVR relay is also installed in #11 Emergency Diesel Generator system, therefore, #11 Emergency Diesel Generator was declared inoperable November 9, 1992, at 1400 hours. With both Emergency Diesel Generators declared inoperable a Limiting Condition For Operation was entered per Technical Specification 3.9.B.3.b. The relay in each Emergency Diesel Generator control cabinet was disconnected. A safety evaluation was performed to ensure that the function of the Emergency Diesel Generator was not affected by disconnecting the NVR relay, and to ensure that adequate alternative actions were taken to compensate for loss of the alarm function performed by the relay. The relays were disconnected and procedures were revised to require more frequent verification of control power breaker position by operations staff. Following completion of these corrective actions the #12 Emergency Diesel Generator was declared operable at 2010 hours. The #11 Emergency Diesel Generator was declared operable at 2243 hours.

Since the annunciator circuit configuration is the same for each Emergency Diesel Generator, the interaction between safety related and non-safety

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

related equipment could have prevented the fulfillment of the safety function of the Emergency Diesel Generator system. This is reportable per 10CFR50.73(a)(2)(v).

CAUSE

The cause of this event was a modification process deficiency. The modification process at the time did not prompt the responsible engineer to perform a thorough review to ensure non-safety related equipment would not affect safety related functions. The original relays were provided with the Emergency Diesel Generator skids. Overheating failure of the original NVR relays prompted a modification in 1977 to improve the reliability of the alarm circuit. The modification recognized that no new failure modes would be introduced by installation of a new NVR relay. Because of this a detailed evaluation of the failure modes was not performed which resulted in the safety classification of the replacement relays being improperly determined. There were no unusual characteristics of the work location and this was not contrary to an approved procedure.

ANALYSIS

The postulated event (i.e., NVR relays shorting and disabling the Emergency Diesel Generator) did not occur. A search of Nuclear Plant Reliability Data System (NPRDS) records indicates that relays of this specific type have been qualified for safety related applications at other nuclear facilities. Although the non-safety related classification of these NVR relays affected the apparent qualification of the Emergency Diesel Generators, the generators were available to perform their function at all times when considered operable.

If a failure were to have occurred, an annunciator would have been received in the main control room and operations staff would have initiated an investigation into the cause of the alarm. Operating experience indicates that the most likely failure mode for a relay coil is an open circuit which would not affect Emergency Diesel Generator operability. However, in the event of a short circuit, breaker coordination may have prevented a loss of the control power to the start and control logic circuits. The NVR relay will not fail as the direct result of an event for which the Emergency Diesel Generator is required to function. Any failure of the relay would be a random event.

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If the failures were to occur after the Emergency Diesel Generators started and loaded onto the bus, only a loss of remote control would result. In the event that the NVR relay in each of the Emergency Diesel Generator control panels shorted causing a loss of the start or control logic power concurrently with a loss of off site power, a loss of all on-site alternating current would occur. The Monticello plant is analyzed for a Station Blackout event and the operating staff would enter existing Station Blackout procedures. This would allow time to investigate and correct the Emergency Diesel Generator failure to automatically operate.

Although the event did not occur, the ability to maintain critical plant parameters, such as reactor water level and pressure during a Station Blackout event, and the availability of time for corrective actions, resulted in no increased consequences to the health and safety of the public.

CORRECTIVE ACTIONS

The following actions have been completed:

1. Both Emergency Diesel Generators were declared inoperable.
2. A safety evaluation was performed to assess the operation of the Emergency Diesel Generator with the power monitoring relay disabled.
3. The power monitoring relay in each of the Emergency Diesel Generators control panel was disconnected to prevent affecting operation of the Emergency Diesel Generators. During these repairs at least one Emergency Diesel Generator remained operable.
4. Operating procedures were revised to increase the frequency of operator rounds to monitor Emergency Diesel Generator start and control logic power by use of alternate indications.
5. The Emergency Diesel Generators were returned to service after completion of actions 2, 3, and 4 above.
6. The modification process has been revised to specifically address safety related equipment being affected by non-safety related equipment since the relays were installed in 1977. The modification process was revised in 1987.

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The following actions will be completed:

1. The existing relays will be dedicated to safety related service or a modification will be completed to restore the alarm function and eliminate the failure mode. This will be completed by end of the 1993 refueling outage.
2. A review of all electrical modifications associated with the Emergency Diesel Generators prior to 1987 will be performed. This will be completed by the end of the 1993 refueling outage.
3. This event will be covered in Engineering and Technical Staff continuing training during second quarter 1993.

ADDITIONAL INFORMATION

Failed Component Identification

None

Previous Similar Events

There have been two previous similar events; Licensee Event Reports 90-001 (Potential Emergency Filter Train Inoperability Due to Interaction with Non-Safety Related Equipment), and 91-016 (Inadequate Design of Emergency Service Water Discharge Header Results in Potential for Loss of Control Room Cooling). The above events involved the failure or potential failure of non-safety related equipment which could affect the operability of safety related equipment. As was the case in this event, the two previous events involved either original design deficiencies or modifications that occurred prior to the modification process revision in 1987. The corrective actions for these events did not prevent this event because the actions did not specifically address the Emergency Diesel Generator system. The ongoing Design Bases Document Review program should discover any similar problems.

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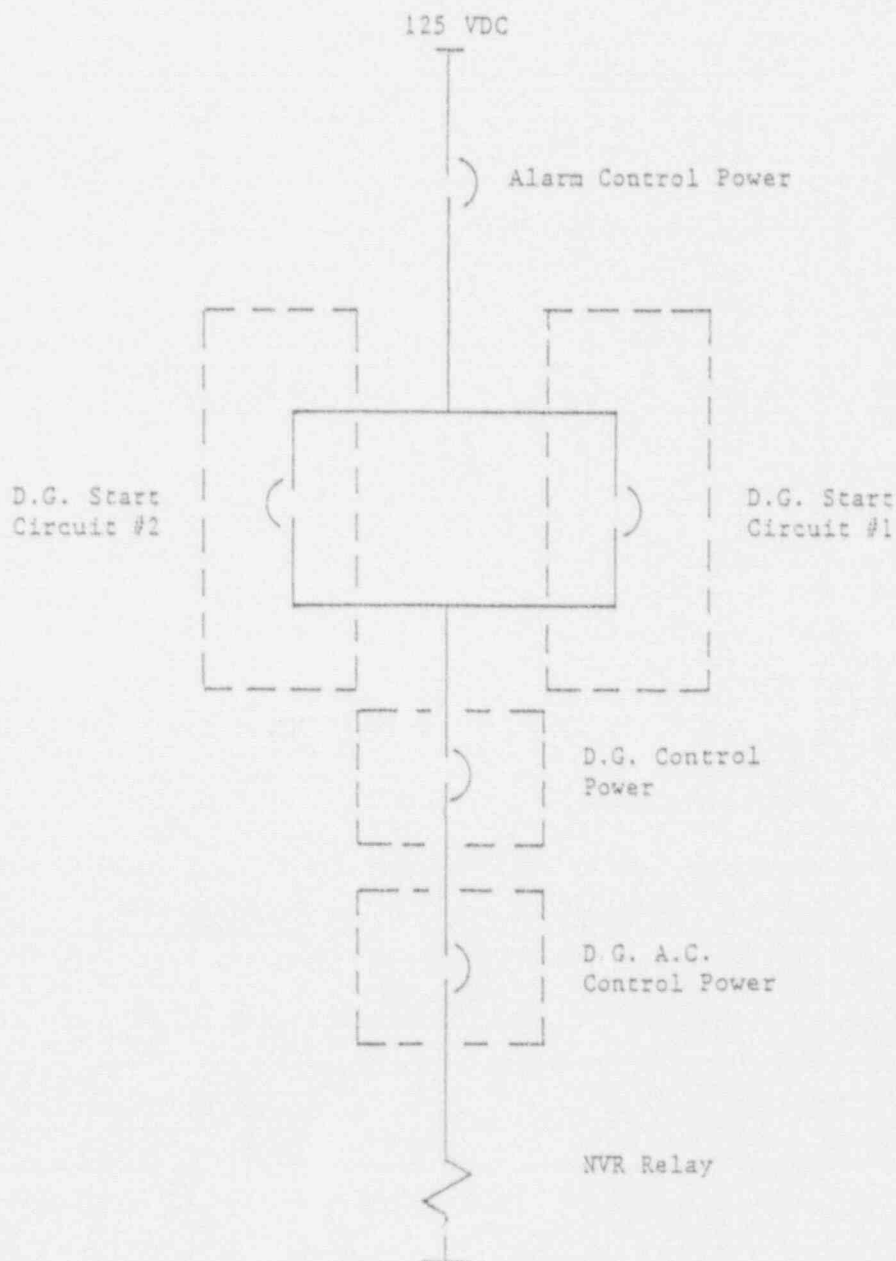


Figure 1