



Nebraska Public Power District

COOPER NUCLEAR STATION
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CNSS948135

May 5, 1994

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Dear Sir:

Cooper Nuclear Station Licensee Event Report 93-035, Revision 1, is forwarded as an attachment to this letter.

Sincerely,

R. L. Gardner
Plant Manager

RLG/nc

Attachment

cc: L. J. Callan
G. R. Horn
J. M. Meacham
R. E. Wiibur
V. L. Wolstenholm
D. A. Whitman
INPO Records Center
NRC Resident Inspector
R. J. Singer
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PDR ADOCK 05000298
S PDR

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: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 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.

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TITLE (4) Both Diesel Generators Declared Inoperable Due To Incorrect Relay Setpoints Resulting From Inadequate Procedure and Implementation of Vendor Recommended Checks

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 NAME	DOCKET NUMBER
11	08	93	93	-- 035 --	01	05	05	94	FACILITY NAME	DOCKET NUMBER 05000
									FACILITY NAME	DOCKET NUMBER 05000

OPERATING MODE (9) N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)									
POWER LEVEL (10) 100	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)						
	20.405(a)(1)(i)	50.36(c)(1)	X 50.73(a)(2)(v)	73.71(c)						
	20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	OTHER						
	20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	(Specify in Abstract below and in Text, NRC Form 366A)						
	20.405(a)(1)(iv)	50.73(a)(2)(ii)	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 John R. Myers	TELEPHONE NUMBER (Include Area Code) (402) 825-3811

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)									
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS
D	EK	59	G080	Y					
E	EK	59	G080	Y					

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)

On November 8, 1993, at 8:46 am, Diesel Generator (DG) 1 was declared inoperable upon finding relay DG-REL-DG1(59) contacts open following DG start during performance of the monthly DG surveillance procedure. DG 2 was declared inoperable at 12:02 pm upon discovering the same indication during subsequent testing. Upon declaring DG 2 inoperable, the Limiting Condition for Operation was entered, resulting in initiation of a power reduction and a Notification of Unusual Event. Following relay re-calibration and testing, DG 1 was declared operable at 5:43 pm and DG 2 at 11:35 pm.

These conditions resulted from an inadequate relay calibration procedure which identified neither the active contacts nor the manufacturer's recommended adjustments. When the relays were re-calibrated during the 1993 refueling outage, the possibility of testing the spare contacts was not recognized by either the procedure or involved personnel. The applicable procedures and programs are being upgraded. These relays provide a permissive to close the DG output breakers. Both diesel generators had been verified capable of automatically loading under design conditions prior to startup from the refueling outage, and although declared inoperable, could have automatically loaded upon a loss of offsite power. Irrespective of relay calibration, both DGs were capable of being manually loaded.

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

A. Event Description

On November 8, 1993, at 8:46 am, Diesel Generator (DG) 1 was declared inoperable when the contacts of relay DG-REL-DG1(59) were found open following DG start while performing Surveillance Procedure 6.3.12.1, Diesel Generator Monthly Operability Test. A subsequent demonstration of operability for DG 2 found the contacts open for the corresponding DG 2 relay, and DG 2 was declared inoperable at 12:02 pm. In accordance with paragraphs 3.9.B.2 and 3.5.F.2 of the Technical Specifications, a load reduction to 25 percent was initiated, and a Notification of Unusual Event was declared at 12:48 pm for the loss of both DGs. These relays provide a permissive to close the DG output breakers. Investigation of the active relay contact setpoints found that the contacts actuated at a higher voltage than specified. At 5:43 pm, following calibration of the DG 1 relay and completion of appropriate testing, DG 1 was declared operable. The Notification of Unusual Event was exited on the same day at 5:47 pm. Calibration of the relay for DG 2 was completed, appropriate testing performed, and DG 2 returned to operable status at 11:35 pm.

During the 1993 refueling outage, the two "59" relays had been found out of calibration. The DG monthly surveillance procedure was revised in November 1993, to require verification of contact status upon start of the DGs. The "59" relays have two sets of contacts, only one of which is active. Subsequent to declaring the DGs inoperable, investigation found that the spare set of contacts on relay DG1(59) actuated within specification, but the active contacts did not. With respect to DG2(59), both the active and spare contacts were out of specification. The relay testing accomplished during the 1993 refueling outage was the first recorded instance of unsatisfactory pickup voltage. A specific cause for the out of calibration condition was not identified at that time; however, based upon the apparent setpoint drift, concern was expressed that the relays could be approaching end of life. Therefore, plans were made to monitor their performance during the monthly surveillance test. This action was initially performed during monthly testing by the system engineer by visually verifying (using the internal "target") that the relay energized during the DG start. The system engineer considered the visual verification inconclusive. The surveillance procedure had been revised, prior to the November test, to verify correct operation of these relays using test instrumentation. Additionally, actions had been initiated to procure replacement relays. The test demonstrated that although adequate voltage was obtained to energize the "targets" and allow the breaker to close automatically, the steady state voltage was less than the relay setpoint.

B. Plant Status

The plant was in normal full power operation at the time this condition was discovered.

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C. Basis for Report

An event or condition alone that could have prevented the fulfillment of the safety function of the Diesel Generators, reportable in accordance with 10CFR50.73(a)(2)(v). Because the procedure for calibrating the "59" relays did not specify the contacts to be calibrated, it could not be assured that the relays would actuate correctly.

Upon discovery of the conditions, both DGs were declared inoperable. With both DGs declared inoperable, a power reduction to 25 percent was initiated. Additionally, due to loss of both DGs, a Notification of Unusual Event was declared. Subsequent evaluation of the design basis for diesel generator loading determined that the diesel generators were actually operable, based on the satisfactory completion of the sequential loading test performed at the end of the 1993 refueling outage.

D. Cause

The major contributor to the misadjustment of the relays was the lack of specific guidance in the calibration procedure for testing and setting the relays. The procedure did not identify the contacts to be tested. Finding the spare set of contacts on DG1(59) within specification indicated the spare set of contacts was adjusted during the 1993 refueling outage rather than the active contacts. The need to provide additional guidance for these activities was not recognized due to the history of successful performance of the relays. When the out-of-tolerance condition was noted during the refueling outage, the possibility that the active contacts had not been tested through either human error or inadequate procedures was not recognized.

Additionally, the calibration procedure did not adequately address the manufacturer recommended inspections and adjustments for the relays. Insufficient contact wipe could have contributed to the out-of-calibration condition of the DG2(59) relay. Contact wipe was not specifically checked in the calibration procedure. The procedure required that the manufacturers inspections and adjustments be performed if the relay was found out of calibration. The discussion of contact wipe in the vendor manual is located in the "Installation" section of the vendor manual which would not normally be reviewed by maintenance personnel to determine periodic inspection and adjustment requirements. Since past relay performance had been satisfactory, measurement of contact wipe had not been addressed.

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E. Safety Significance

DG-REL-DG1(59) and DG2(59) are overvoltage relays used to provide a permissive to close 4160 VAC switchgear breakers EG1 and EG2, which connect the diesel generators to the safety related busses. In the event of an initiation signal and DG start, these relays provide a permissive indicating the DG has attained proper voltage to be automatically connected to the safety related busses following a loss of offsite power (LOOP). In the event of a concurrent LOOP and LOCA, the plant design basis, the relays would have functioned correctly due to the transient overvoltage condition associated with a DG start. This feature was verified by surveillance testing during the refueling outage subsequent to relay calibration. This out of calibration condition did not affect the manual closure of the breakers, and the DGs could have been manually connected to the safety related busses. A LOCA with a delayed LOOP is beyond the plant design basis and has been estimated to result in a mean frequency for core damage of 8.92 E-14/year.

F. Safety Implications

The plant was in operation at full power, the condition assumed to be the design basis accident condition for a loss of offsite power event.

G. Corrective Action

On November 9, a Corrective Action Review Board (CARB) was established to investigate this event and recommend corrective actions. The "as found" data for the spare set of contacts on relay DG1(59) indicated that the spare set of contacts had been calibrated during the 1993 refueling outage.

Based on discussions with the electrician who calibrated relay DG2(59) during the refueling outage, and the subsequent finding of both sets of contacts out of specification, the reliability of the relay was questioned. At the time these discussions were occurring, DG 2 was inoperable due to an unrelated problem. A work item was immediately generated to inspect and adjust the contact wipe if required. In preparation for this activity, the setpoint was again checked to ensure the relay would continue to function correctly. The wipe was checked and left within vendor recommendations. A test to validate repeatability was performed. The pick up voltage was found to be within specification, and the results were repeatable. The relay manufacturer was contacted the following day (November 10), and additional continuity testing was recommended. These tests were performed with satisfactory results, and DG 2 was declared operable on November 10 at 8:00 pm. The continuity tests were subsequently conducted on DG 1. Additionally, surveillance tests conducted on December 6 and 7 further confirmed operability of the relays.

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G. Corrective Action (continued)

Actions to prevent recurrence include:

1. A new procedure, approved April 28, 1994, will provide detailed guidance for calibration of "59" relays. The checks and inspections in the vendor manual are included in these instructions.
2. The relay calibration procedure, which covers many relays, was reviewed, and 22 additional relays were identified having spare contacts. Further investigation found these relays were tested using a relay test set which ensures the appropriate contacts are tested. Additionally, other relay testing procedures will be reviewed and upgraded as required to address this concern.
3. Other safety related vendor manuals which have not completed the review process will be reviewed for appropriate inspections and checks of operational and maintenance criteria. Additionally, the process for reviewing vendor manuals was evaluated to ensure that the process adequately identifies necessary maintenance instructions.
4. Management conducted tail-gate sessions with appropriate personnel to discuss the importance of ensuring procedures are explicit in describing how the work is to be performed and correction of noted deficiencies.
5. Maintenance procedures will be evaluated to ensure they are written at the appropriate skill level for the personnel performing the procedure. Based upon the results of this evaluation, training requirements will be re-assessed and necessary improvements implemented.
6. During the discussions with the manufacturer, it was noted that these relays may not be the optimum selection for this application. The application of these relays was evaluated, and it was determined that they will be replaced during the next refueling outage.

H. Similar Events

None