

Nebraska Public Power District

COOPER NUCLEAR STATION
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NLS950247

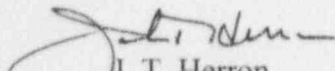
December 23, 1995

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555-0001

Dear Sir:

Cooper Nuclear Station Licensee Event Report 95-020 is forwarded as an attachment to this letter.

Sincerely,


J. T. Herron
Plant Manager

/crm

Attachment

cc: L. J. Callan
G. R. Horn
J. H. Mueller
R. G. Jones
R. A. Sessoms
M. F. Peckham
R. L. Gardner
N. E. Champlin
T. N. Ferrando
INPO Records Center
NRC Resident Inspector
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CNS Training
CNS Quality Assurance

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FACILITY NAME (1) **COOPER NUCLEAR STATION** DOCKET NUMBER (2) **05000298** PAGE (3) **1 OF 4**

TITLE (4)
Design Change Deficiency Resulting in Noncompliance with 10CFR50 Appendix R

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	25	95	95	-- 020	-- 00	12	23	95	FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	POWER LEVEL (10)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more) (11)								
N	000	20.2201(b)		20.2203(a)(2)(v)	<input checked="" type="checkbox"/>	50.73(a)(2)(i)		50.73(a)(2)(viii)		
		20.2203(a)(1)		20.2203(a)(3)(i)	<input checked="" type="checkbox"/>	50.73(a)(2)(ii)		50.73(a)(2)(x)		
		20.2203(a)(2)(i)		20.2203(a)(3)(ii)		50.73(a)(2)(iii)		73.71		
		20.2203(a)(2)(ii)		20.2203(a)(4)		50.73(a)(2)(iv)		OTHER		
		20.2203(a)(2)(iii)		50.36(c)(1)		50.73(a)(2)(v)		Specify in Abstract below or in NRC Form 366A		
		20.2203(a)(2)(iv)		50.36(c)(2)		50.73(a)(2)(vii)				

LICENSEE CONTACT FOR THIS LER (12)

NAME: **Chris R. Moeller, Senior Staff Licensing Engineer** 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

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE): NO

EXPECTED SUBMISSION DATE (15)

MONTH	DAY	YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On November 25, 1995, during a walkdown for an unrelated design change, Diesel Generator (DG) 2 was found not to be in compliance with Appendix R. Relays required for emergency diesel start were incorrectly connected to the load-side instead of the line-side of a control circuit fuse added to correct an Alternate Shutdown concern discovered on August 4, 1994, and reported in LER 94-016. In this configuration, emergency and local start capabilities would have been compromised in the event of an Alternate Shutdown fire affecting Control Room indicating light circuits. At the time this condition was discovered, the plant was in cold shutdown and Alternate Shutdown capabilities were not required.

The cause of this event is Management/Quality Assurance Deficiency (NUREG-1022, Appendix B, Root Cause Code E). Engineering management failed to establish and maintain high standards for performance during situations of high stress and schedule pressure. This allowed an inattention to detail error to be introduced during the initial design phase and an apparent process shortcut during independent design verification which resulted in the error being undetected. Contributing to this event was a weakness in the post-modification testing that continued to allow the wiring error to go undetected. Corrective actions were taken to correct the wiring deficiency, assess past DG operability, and to review other design changes implemented during the same time period for errors. A reorganization has been implemented to address management weaknesses within Engineering. Additional corrective actions include Industry Events training, revising the procedure controlling post-modification testing, and reviewing additional design changes for inattention to detail errors.

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

PLANT STATUS

Cooper Nuclear Station (CNS) was in cold shutdown for the RE16 refueling outage at the time of discovery.

EVENT DESCRIPTION

On August 4, 1994, it was determined that a fire induced short circuit could prevent the starting of Diesel Generator (DG) 2 during Alternate Shutdown conditions. This condition, reported to the NRC in LER 94-016, was addressed by adding Fuses F13 and F14 to the DG 2 control circuit per Design Change 94-263, "Fuse Modification For DG Engine Control Panels." The intent of this modification was to address Appendix R concerns by installing isolation fusing to control circuits providing remote indication on Bench Board "C" in the Control Room.

On November 25, 1995, during the implementation of Design Change 93-024, "DG Governor Replacement and Electric Overspeed Modification," it was discovered that DG 2 was not in compliance with Appendix R. In addition to four local indicators, the following relays required for emergency diesel start were found to be connected to the load-side instead of the line-side of Fuse F13:

DG-REL-DG2(4MX)	DG 2 Control Master Relay
DG-REL-DG2(4MX1)	DG 2 Control Master Relay
DG-REL-DG2(4MX2)	DG 2 Control Master Relay
DG-REL-DG2(4MX3)	DG 2 Control Master Relay
DG-REL-DG2(4EMX)	DG 2 Control Master Emergency Relay
DG-REL-DG2(4EMX1)	DG 2 Control Master Emergency Relay
DG-REL-DG2(4EMX2)	DG 2 Control Master Emergency Relay
DG-REL-DG2(4EMX3)	DG 2 Control Master Emergency Relay
DG-REL-DG2(68SBX)	DG2 Control Synchronizing Block Relay
DG-REL-DG2(4FOX)	DG2 Fuel Oil Boost Pump Relay

In this configuration, emergency and local start capabilities would have been compromised in the event of an Alternate Shutdown fire affecting the Control Room remote indication circuits.

CAUSE

The cause of this event is Management/Quality Assurance Deficiency (NUREG-1022, Appendix B, Root Cause Code E). Engineering management failed to establish and maintain high standards for performance during situations of high stress and schedule pressure. This allowed an inattention to detail error to be introduced during the initial design phase of DC 94-263 and an apparent process shortcut during independent design verification which resulted in the error going undetected. Contributing to this event was a weakness in the post-modification testing that continued to allow the wiring error to go undetected.

Due to perceived schedule pressure, the practice of verifying field wiring was not performed during the initial design phase of DC 94-263. Instead, schematic and wiring connection drawings were relied upon for developing the fuse installation instructions. Although the drawings used were correct, the probability for error was increased due to their complexity. This probability was further increased by the failure to recognize differences between the "electrically equivalent" schematic drawings, wiring connection diagrams, and the field wiring conditions. Had expectations been established with regard to a field verification of the wiring, the error would not have occurred.

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

The wiring error introduced during the initial design phase went undetected during the independent design verification. Due to other work efforts, the "usual" cross disciplinary supervisor was unavailable to perform the independent design verification. Instead, the independent design verification was performed by a lead engineering specialist. While the lead specialist was competent and met the qualification requirements, he may have been influenced by the stressful circumstances at that time plus perceived schedule pressure. Consequently, an apparent short cut was taken during the review resulting in the wiring connection drawings not being fully utilized. Had expectations been explicitly established for the nature and depth of review required, the error would have been discovered prior to implementation.

Once the modification was installed, a simulated failure of the fuses was not performed. Instead, the post-modification testing only demonstrated the functionality of the circuits directly affected by the installation. Had the post-modification testing philosophy established the need to test the intent of the modification, the error would have been discovered prior to returning DG 2 to service.

SAFETY SIGNIFICANCE

The Alternate Shutdown capability is provided to mitigate the effects of a special event (i.e., fire), thus this deficiency did not adversely affect the ability of the DG or the Electrical Distribution System to meet their Design Basis Accident requirements. In the event of an Alternate Shutdown fire, DG 2 could potentially have been rendered inoperable due to a fuse failure resulting from a fault in the Control Room indicating circuits. Based on the assumption that the redundant systems were rendered inoperable from the effects of a fire in the alternate shutdown areas and repair procedures were not in place to address circuit malfunctions, the ability to reach a safe shutdown condition from power operation would have been jeopardized. However, stringent controls on combustible materials and ignition sources, and the ability to quickly detect and suppress a fire through both automatic systems and manual fire fighting capability, minimize the likelihood of a fire of the magnitude required to cause the postulated cable damage.

CORRECTIVE ACTIONS

A hand-over-hand walkdown of the DG 2 control circuitry was performed to provide assurance that no other power distribution discrepancies existed. In addition, an analysis of as-building results was performed to determine past DG 2 operability. As documented in Engineering Judgement (EJ) 95-137, the worst case in-rush current resulting from the incorrectly connected relays and indicators would not have exceeded the current-time rating for the F13 fuse.

The wiring discrepancy was corrected as part of Amendment 1 to DC 93-024.

To assess the generic implications of this condition, other electrical and instrument and control modifications performed during the same period when perceived schedule pressure was high (July to November, 1994) were reviewed. Based on this criteria, eight design changes were reviewed. While no major errors affecting operability or functionality were identified, several minor errors attributed to inattention to detail were revealed (e.g., labeling and database errors), further substantiating the stated cause for this event.

Weaknesses within Engineering management were recognized and addressed as part of a Phase II Performance Improvement Plan to improve Engineering effectiveness. Implementation of this plan resulted in a reorganization of Engineering and the restaffing of key positions.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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

The following additional corrective actions have been established to address the specific concerns identified through this occurrence:

1. To address the inattention to detail error that occurred and subsequent shortcut taken, this event will be discussed in Industry Events training for the Engineering Department as lessons learned.
2. To address the contributing cause of inadequate post-modification testing philosophy, the controlling procedures will be reviewed and appropriate revisions made to establish the expectations with regard to the scope and philosophy for testing design change intent.
3. To further validate that generic concerns have been addressed, selected design changes from 1993 and 1995 will be reviewed for similar inattention to detail errors and, if needed, additional corrective actions taken. The selected design changes will be in addition to the eight design changes previously reviewed.

PREVIOUS EVENTS

- LER 89-020 Unplanned Group Isolations During Design Change Acceptance Testing Due To Wiring Errors
- LER 93-016 Design Change Installation Deficiency Resulting In Control Room Emergency Bypass System Activation Failure During Surveillance Testing
- LER 93-025 Hydrogen/Oxygen Monitoring System Operability Concerns Due To Moisture Accumulation And Sample Pump Reliability
- LER 94-016 Noncompliance With 10CFR50 Appendix R, Inadequate Isolation Of Diesel Generator Control Circuits
- LER 94-021 Design Error That Allows Spurious DG Room HVAC Isolation During A Fire Or Seismic Event
- LER 94-034 Emergency Lighting System Cannot Be Assured Of Meeting 8 Hour Operation Requirement Due To Design And Maintenance Deficiencies

Correspondence No: NLS950247

The following table identifies those actions committed to by the District in this document. Any other actions discussed in the submittal represent intended or planned actions by the District. They are described to the NRC for the NRC's information and are not regulatory commitments. Please notify the Licensing Manager at Cooper Nuclear Station of any questions regarding this document or any associated regulatory commitments.

COMMITMENT	COMMITTED DATE OR OUTAGE
To address the inattention to detail error that occurred and subsequent shortcut taken, this event will be discussed in Industry Events training for the Engineering Department as lessons learned.	None
To address the contributing cause of inadequate post-modification testing philosophy, the controlling procedures will be reviewed and appropriate revisions made to establish the expectations with regard to the scope and philosophy for testing design change goals.	None
To further validate that generic concerns have been addressed, selected 1993 and 1995 design changes will be reviewed for similar inattention to detail errors and, if needed, additional corrective actions taken.	None