NRC FORM 366 (4-95) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 04/30/98

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), 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.

LICENSEE EVENT REPORT (LER)

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

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COOPER NUCLEAR STATION	05000298	1 OF 5

TITLE (4)

Drawing Change Process 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 --	01	05	07	96	FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	N
POWER LEVEL (10)	000

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)

	20.2201(b)		20.2203(a)(2)(v)	X	50.73(a)(2)(i)		50.73(a)(2)(viii)
	20.2203(a)(1)		20.2203(a)(3)(i)	X	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	TELEPHONE NUMBER (Include Area Code)
Chris R. Moeller, Senior Staff Licensing Engineer	(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)			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 25, 1995, during a walkdown for an unrelated design change (DC), Diesel Generator (DG) 2 was found not to be in compliance with Appendix R. Relays required to start and run DG 2 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 and run 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). Due to weaknesses in the Drawing Change Process, all drawings affected by the DC to correct the condition reported in LER 94-016 were not immediately flagged as pending revision. Consequently, a subsequent DC was developed and implemented using drawings that did not reflect the actual plant configuration and, as a result, a portion of the DG 2 control logic was rendered susceptible to an Appendix R fault. Immediate actions were taken to correct the wiring deficiency and to assess past DG operability for non-Appendix R events. To assess generic concerns, the revision history of connection diagrams for 5 of 25 critical Control and Auxiliary Relay Room panels were reviewed for potential modification interactions. No discrepancies were identified. A project plan is being developed to review the connection diagrams for the remaining 20 panels. The Drawing Change Process is being revised to address the identified weaknesses. Additionally, training will be presented to appropriate design personnel on the process revisions.

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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 (DC) 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 DC 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 to start and run DG 2 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, the capability to start and run DG 2 would have been compromised in the event of an Alternate Shutdown fire affecting the Control Room remote indication circuits.

CAUSE

This condition was caused by weaknesses in the Drawing Change Process. As further detailed below, all drawings affected by DC 94-263 were not immediately flagged as having pending changes. Consequently, a subsequent design change was developed and implemented using drawings that did not reflect the actual plant configuration and, as a result, a portion of the DG 2 control logic was rendered susceptible to an Appendix R fault.

On October 7, 1994, a design flaw was discovered that could have caused both DGs to be rendered inoperable during a fire in the Turbine Building or a design basis earthquake. During either of these events the High Pressure Carbon Dioxide Extinguishing System, which protects the DG Rooms from fire, could have erroneously isolated the HVAC to both DG Rooms, thereby threatening DG operability. This condition, reported in LER 94-021, was corrected by DC 94-302, "HV-FCU-(HV-DG-1C) and HV-FCU-(HV-DG-1D) Circuit Modification."

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At the time that DC 94-263 and DC 94-302 were developed, the Drawing Change Process provided two mechanisms for the tracking of pending drawing changes. Following the approval of a modification:

- The aperture cards for all affected drawings listed in the modification were stamped to indicate that a change was pending.

- The Drawing Control Program Database (a computerized database providing information such as the current revision number and pending changes) was updated to reflect pending changes. However, only the drawings maintained in the Control Room were updated in the computer with pending revisions; non-Control Room drawings were updated in the computer following submittal of the Drawing Change Notices (DCNs). Per the Design Change Process, this would occur (for non-Control Room drawings) as part of the modification completion report following installation. As it applies to this condition, the post-installation DCNs for DC 94-263 were not submitted until after the design work and independent design review for DC 94-302 had been completed.

Therefore, the Drawing Control Program Database did not reflect the fact that non-Control Room drawings subsequently used in the development of DC 94-302 were pending revision as a result of DC 94-263. Because of this weakness in the Drawing Change Process, the preparer and independent reviewer (although having consulted the Drawing Control Program Database to confirm the current status of drawings used) were unaware that drawings used to develop DC 94-302 no longer reflected the configuration of the plant and, hence, the need to coordinate the two modifications.

The following provides an overview of the key events which led to this condition:

July, 1994	Preparation of DC 94-263 begins.
August, 1994	DC 94-263 is approved. The aperture cards for all affected drawings are stamped to identify pending changes. The Drawing Control Program Database is updated to reflect pending changes on those drawings maintained in the Control Room. (The status of non-Control Room drawings was not updated.)
August, 1994	Implementation of DC 94-263.
September, 1994	The Status Report for DC 94-263 is issued. Included in the Status Report are the DCNs for the drawings maintained in the Control Room.
October, 1994	Preparation of DC 94-302 begins. Non-Control Room drawings affected by DC 94-263 are utilized.
December, 1994	Implementation of DC 94-302.
February, 1995	Closure report for DC 94-263 prepared. DCNs for the non-Control Room drawings are submitted and the Drawing Control Program Database updated, accordingly.

The cause classification for this condition is Management/Quality Assurance Deficiency (NUREG 1022, Appendix B, Cause Code E.)

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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 unlikely 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. (Using Probabilistic Safety Analysis methods, the frequency of initiator for fires challenging the DG Appendix R isolation fuse was determined to be below the screening cutoff for evaluation of a Core Damage Frequency increase.) 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 maintain a safe shutdown condition from power operation could 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

The wiring discrepancy was corrected as part of Amendment 1 to DC 93-024, thus eliminating the susceptibility to an Appendix R fault.

An analysis of as-building results was performed to determine past DG 2 operability for non-Appendix R events. 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. Therefore, DG 2 remained operable for non-Appendix R events.

A hand-over-hand walkdown of the DG 2 control circuitry was performed to ensure that no other discrepancies existed. None were found. To further assess the generic concerns associated with this condition, a review was conducted to determine which panels were most likely to have a similar error. As a result, 25 Control Room and Auxiliary Relay Room panels (i.e., those panels that control a significant portion of the Emergency Core Cooling Systems) were identified. The selection of these panels was based on the following:

1. The connection diagrams for these panels contain a high concentration of daisy-chains.

2. These panels have had the largest concentration of modifications performed.

Of the 25 panels, 5 were selected for an immediate detailed evaluation. The connection diagrams for each selected panel were identified and, for each diagram, a table was developed showing the revision history. From the revision history table, a time line was constructed to identify potential modification interactions. (A potential modification interaction was assumed to exist if a pending revision to a connection diagram existed at the time an independent design review was completed for a modification.) Any potential interaction identified by this process was examined further to ensure the suspect termination points and applicable circuitry are properly configured. No discrepancies were identified in the 5 selected panels.

A project plan for reviewing the remaining 20 panels will be developed using the lessons learned from the completed 5 panel review. The review of the 20 remaining panels will be completed by June 30, 1996.

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

As a result of process improvements unrelated to this condition which were implemented in June 1995, all drawings pending revision are currently being flagged in the Drawing Control Program Database.

The following additional corrective actions have been or are being taken to prevent recurrence:

1. A revision to Procedure 3.7, "Drawing Change Notice," has been implemented to allow pre-assigning DCN numbers to facilitate the tracking of drawings which have pending changes. (Previously, drawings were flagged as pending revision but DCN numbers were not pre-assigned for tracking purposes.)

2. Procedure 3.4.3, "Design Change," and Procedure 3.4.5, "Minor Modifications," will be revised to require:

   - The acquisition of pre-assigned DCNs as soon as possible during modification development.
   - In addition to verification of drawing revision, the documentation of the review of pending drawing changes for impact to the modification.

3. Procedure 3.4.8, "Design Verification," will be revised to verify during the independent design review that:

   - Pre-assigned DCN numbers have been obtained for affected drawings.
   - Pending changes to reference drawings identified and taken into consideration.

4. Training on the above described procedure changes will be provided to the appropriate design personnel.

PREVIOUS EVENTS

LER 94-016 Noncompliance With 10CFR50 Appendix R, Inadequate Isolation Of Diesel Generator Control Circuits

Correspondence No: NLS960073

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
A project plan for reviewing the remaining 20 panels will be developed using the lessons learned from the completed 5 panel review and the 20 remaining panels reviewed.	June 30, 1996
Procedure 3.4.3, "Design Change," and Procedure 3.4.5, "Minor Modifications," will be revised to require: 1)The acquisition of pre-assigned DCNs as soon as possible during modification development; 2)In addition to verification of drawing revision, the documentation of the review of pending drawing changes for impact to the modification.	None
Procedure 3.4.8, "Design Verification," will be revised to verify during the independent design review that: 1) Pre-assigned DCN numbers have been obtained for affected drawings; 2)Pending changes to reference drawings identified and taken into consideration.	None
Training on the above described procedure changes will be provided to the appropriate design personnel.	None