Nebraska Public Power District
Nebraska's Energy Leader

NLS2000008
February 10, 2000

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

Gentlemen:

Subject: Licensee Event Report No. 2000-002
Cooper Nuclear Station, NRC Docket 50-298, DPR-46

The subject Licensee Event Report is forwarded as an enclosure to this letter.

Sincerely,

J.A. McDonald
Plant Manager

/rss
Enclosure

cc: Regional Administrator
USNRC - Region IV

Senior Project Manager
USNRC - NRR Project Directorate IV-1

Senior Resident Inspector
USNRC

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NRC FORM 366 (6-1998) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104 EXPIRES 06/30/2001

Estimated burden per response to comply with this mandatory information collection request: 50 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the 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. If an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE EVENT REPORT (LER)

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

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TITLE (4)

Appendix R Safe Shutdown Analysis Vulnerability due to Potential Conductor to Conductor Hot Shorts

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
01	11	2000	2000	-- 002 --	00	02	10	2000		05000
									FACILITY NAME	DOCKET NUMBER
										05000

OPERATING MODE (9)	4
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)		50.73(a)(2)(i)		50.73(a)(2)(viii)
	20.2203(a)(1)		20.2203(a)(3)(i)		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)	X	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)
S.R. Mahler, Assistant Licensing Manager	(402) 825-3811

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
A	KP			N					

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 January 11, 2000, at 1752 hours Central Standard Time, Cooper Nuclear Station (CNS) discovered that a vulnerability to a fire induced hot short associated with the diesel fire pump control circuitry exists that could inhibit the ability of CNS to safely shutdown following a fire. During a postulated fire scenario in the Cable Spreading Room (CSR) fire area, the three sources of water to the service water (SW) pump gland seals would be lost due to Appendix R assumptions. The SW pumps are required to operate to supply the cooling water to the essential systems. A loss of the SW system [EIIS Code: BI] due to loss of the three sources of water for the gland seals would prevent the plant from achieving and maintaining safe shutdown following a postulated Appendix R fire. This condition, therefore, does not meet the 10CFR50, Appendix R, Section III.L requirements.

The cause of this event is attributed to a human error. The risk significance evaluation determined this condition to be risk insignificant.

Upon discovery of this condition, a continuous fire watch was instituted in the CSR as a compensatory measure. A plant modification will be installed to address the vulnerability of the diesel fire pump control circuitry to the fire induced hot short.

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

PLANT STATUS

Cooper Nuclear Station (CNS) was in Mode 4 (Cold Shutdown) at the time of discovery of the condition.

BACKGROUND

In accordance with the requirements of 10CFR50.48 and Generic Letter 81-12, "Fire Protection Rule," the plants docketed prior to January 1, 1979, which include CNS, are required to comply with Sections III.G, III.J, and III.O of 10CFR50, Appendix R. In addition, Section III.L of Appendix R is applicable to plants crediting alternative shutdown capability to achieve compliance in the specific fire area. CNS credits alternative shutdown capability for the Cable Spreading Room (CSR) as well as several other areas of the plant. Appendix R, Section III.L.3 includes the requirement that alternative shutdown capability accommodate postfire conditions where offsite power is available and where offsite power is not available for 72 hours.

Appendix R, Section III.L.5 requires that equipment and systems comprising the means to achieve and maintain safe shutdown shall be free of fire damage. Fire damage is defined as circuit failures in associated cables, as well as direct fire impingement upon the equipment or cables. Generic Letter 81-12 defines the circuit failure modes that must be considered as part of Appendix R analysis. Sections III.G.2 and III.L.7 of Appendix R define the circuit failure modes as hot shorts, open circuits, and shorts to ground. For three-phase AC circuits, the probability of getting a hot short on all three phases in the power sequence to cause spurious operation of a motor is considered sufficiently low as to not require evaluation except for any cases involving high-low pressure interfaces. High-low pressure interfaces are defined as primary system boundary valves whose opening could subject downstream piping rated at a lower pressure to primary system pressure and result in a loss of coolant accident. For ungrounded DC circuits, no further evaluation is necessary except for any cases involving high-low pressure interfaces, if it can be shown that only two hot shorts of the proper polarity without grounding could cause spurious operation. The circuit failures identified in this event are not involving high-low pressure interfaces, therefore, hot shorts, open circuits and shorts to ground must be postulated to occur on every conductor associated with a safe shutdown component as a result of the fire.

The service water (SW) pumps are required to operate to supply cooling water to the essential residual heat removal service water [EIIS Code: BO], reactor equipment cooling heat exchangers [EIIS Code: CC], diesel generator jacket water and diesel engine turbocharger intercoolers [EIIS Code: LB], and the backwash strainers. There are three sources that provide cooling water to the SW pump gland seals. The water from the river well is the primary source of water to the SW pump gland seals. The essential (first) backup source of water to the SW pump gland seals is from downstream of the SW pumps through SW motor operated valve, SW-MOV-2129MV. The emergency (second) backup source of water to SW pump gland seals is from the diesel driven fire pump (FP-P-D) through a fail open solenoid valve, SW-SOV-SSV10, connected to the fire water system. CNS Appendix R Safe Shutdown Analysis methodology credits the diesel driven fire pump to function during the postulated fire.

EVENT DESCRIPTION

On January 11, 2000, at 1752 hours Central Standard Time (CST), during preparation of the permanent plant modification to replace a plant temporary modification (PTM 96-33) associated with LER 96-009-03,

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

it was discovered that an additional vulnerability to fire induced hot shorts exists that could inhibit the ability of CNS to safely shutdown following a fire. The vulnerability involves a multi-conductor cable (FP-304) located in the cable spreading room (CSR). This cable carries 24VDC start control circuits for the diesel driven fire pump and 120VAC power circuits. The postulated fire scenario in the CSR assumes that the fire could cause a conductor-to-conductor short (either within the same cable or between FP-304 and the two other cables inside the conduit) such that the 24VDC circuits would be energized by the 120VAC power. This condition is assumed to disable the automatic starting and running of the diesel driven fire pump, which is credited for the emergency water supply to the gland seals of the service water (SW) pumps.

The postulated fire scenario also assumes that the fire in the CSR would damage the cable which provides power for the service water motor operated valve, SW-MOV-2129MV. This valve is required to remain open to provide an essential backup water supply to the gland seals. Since CNS credits alternate shutdown capability for the Cable Spreading Room, the Appendix R assumption of loss of offsite power would result in unavailability of the river well pumps which supply water to the gland seals of the SW pumps. As discussed above, the diesel fire pump source of gland seal water is lost due to the hot short. The three sources of water to the SW pump gland seals would be unavailable during an Appendix R fire at CNS. The gland seal system [EIIS Code: KO] is required to assure that the SW pump bearings and stuffing box packing receive adequate lubrication during operation. The SW pumps are required to operate during and after a fire to supply cooling water to the essential residual heat removal service water [EIIS Code: BO], reactor equipment cooling heat exchangers [EIIS Code: CC], diesel generator jacket water and diesel engine turbocharger intercoolers [EIIS Code: LB], and the backwash strainers. The loss of the SW system [EIIS Code: BI] would prevent the plant from achieving and maintaining cold shutdown following a postulated fire.

Upon discovery of this condition, a continuous fire watch was instituted in the cable spreading room as a compensatory measure.

On January 11, 2000, at 2126 hours CST, a four-hour report of this condition was submitted to the NRC per 10CFR50.72(b)(2)(iii)(A). Subsequently, on January 12, 2000, at 1733 hours CST, an update containing additional information to the four-hour report was submitted to the NRC per 10CFR50.72(c)(2).

BASIS FOR REPORT

The above condition was determined to be reportable per the requirements of 10CFR50.73(a)(2)(v), any event or condition that alone could have prevented the fulfillment of the safety function of structures or systems that are needed to shut down the reactor and maintain it in a safe shutdown condition.

CAUSE

The cause of this condition is attributed to an isolated human error. During the 1996 Appendix R Revalidation Project, the analysts failed to recognize the unique design (grounded DC) of the diesel fire pump control circuit and made an incorrect assumption when performing the circuit analyses used to support the Appendix R compliance assessment of the project.

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

An extent of condition evaluation was performed to determine which other systems, structures, components, processes, or programs could have a similar problem. It was determined that this condition does not exist in any other structures, systems, or components.

SAFETY SIGNIFICANCE

This condition is determined to be risk insignificant. The frequency of the postulated fire scenario is estimated to be 4.2E-08 per year, which is below the acceptance guideline of 1.0E-06 per year for the core damage events, as described in the Regulatory Guide 1.174.

This condition constitutes a safety system functional failure. The postulated fire in the cable spreading room fire area could have resulted in a loss of the service water system, which, in turn, would have prevented the plant from achieving and maintaining cold shutdown following a postulated fire.

CORRECTIVE ACTIONS

Upon discovery of the condition, a continuous fire watch was instituted in the cable spreading room as a compensatory measure. The fire watch will be maintained until completion of the plant modification "Elimination of FP-P-D Appendix R Fire Damage Vulnerabilities." This modification will be completed prior to startup from Refueling Outage 19.

PREVIOUS EVENTS

LER 1996-009-03, "Appendix R Safe Shutdown Analysis Vulnerabilities," dated June 1, 1998, was submitted to the NRC upon discovery of certain non-conservative analysis assumptions used in the CNS Appendix R Safe and Alternate Shutdown Report. The corrective actions described in LER 1996-009-03 included a complete revalidation of the CNS Appendix R analysis. The event described in this LER was caused by a human error that occurred during the revalidation effort.

Correspondence No: NLS2000008

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 NL&S Manager at Cooper Nuclear Station of any questions regarding this document or any associated regulatory commitments.

COMMITMENT	COMMITTED DATE OR OUTAGE
Plant Modification, "Elimination of FP-P-D Appendix R Fire Damage Vulnerabilities," will be completed prior to startup from Refueling Outage 19	Prior to startup from Refueling Outage 19