



**Nebraska Public Power District**  
*Nebraska's Energy Leader*

NLS2000013  
February 14, 2000

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

Gentlemen:

Subject: Licensee Event Report No. 2000-003  
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

/rar  
Enclosure

cc: Regional Administrator  
USNRC - Region IV

Senior Project Manager  
USNRC - NRR Project Directorate IV-1

Senior Resident Inspector  
USNRC

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W. Leech  
MidAmerica Energy

**LICENSEE EVENT REPORT (LER)**

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

<b>FACILITY NAME (1)</b> Cooper Nuclear Station	<b>DOCKET NUMBER (2)</b> 05000298	<b>PAGE (3)</b> 1 OF 6
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**TITLE (4)**  
Failure to Meet Logic System Functional Testing (LSFT) Surveillance Requirement When Satisfied by Multiple Surveillance Procedures

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	12	2000	2000	-- 003 --	00	02	14	2000	FACILITY NAME	DOCKET NUMBER 05000
									FACILITY NAME	DOCKET NUMBER 05000

<b>OPERATING MODE (9)</b> 4	<b>POWER LEVEL (10)</b> 000	<b>THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)</b>								
		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)		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)**

<b>NAME</b> S. R. Mahler, Assistant Nuclear Licensing and Safety Manager	<b>TELEPHONE NUMBER (Include Area Code)</b> (402) 825-3811
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**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

<b>SUPPLEMENTAL REPORT EXPECTED (14)</b>				<b>EXPECTED SUBMISSION DATE (15)</b>		
<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE).	<input checked="" type="checkbox"/> NO			MONTH	DAY	YEAR

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

On January 12, 2000, during a review of the Technical Specification pre-startup checklist, it was identified that Surveillance Requirement (SR) 3.3.6.3.5 had not been fully satisfied since June 12, 1995. Specifically, a contact set of two SRV Low-Low Set (EIIS:RV) arming logic relays (EIIS:RLY) had not been tested on an 18 month frequency to satisfy the Logic System Functional Test (LSFT) requirement of SR 3.3.6.3.5 (Table 3.3.6.3-1, Function 2). Procedure 6.SRV.303 was being performed to satisfy this requirement in lieu of Procedure 6.SRV.301. Both procedures indicated that their performance satisfied the surveillance requirement, but procedure 6.SRV.303 did not test one of the required relay contact sets. The plant was in a forced outage (shutdown) at the time of discovery. There was no actual safety significance for this event. Immediate actions were taken to perform the required test and successfully test the required contact set of both relays. Other contacts of the same relays have been routinely tested at the required frequency. Procedure 6.SRV.303 has been placed on administrative hold until corrected. Testing the required contact set was added to procedure 6.3.2.2 (now 6.SRV.301) as part of a 1994 LSFT project review. In 1994, the procedure change process lacked sufficient guidance to ensure procedure 6.2.2.2.7 (now 6.SRV.303) was also adequately revised. The current procedure change process includes explicit guidance for evaluating LSFT changes.

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

PLANT STATUS

Cooper Nuclear Station (CNS) was in Mode 4, Cold Shutdown, at the time the inadequate testing of relays MS-REL-K20A and K20B was identified.

BACKGROUND

The low-low set logic and instrumentation is designed to: 1) minimize the effects of postulated thrust loads on the safety/relief valve (SRV) discharge lines, and 2) minimize the effects of pressure loads on suppression pool structural components. This is accomplished by assigning preset opening and closing setpoints to two of eight SRVs (EIIS:RV). These setpoints are selected such that the two SRVs will stay open longer and lower pressure further; thus, releasing more reactor steam (energy) to the suppression pool, and hence more energy (and time) is required for reactor vessel repressurization and subsequent SRV openings. If the amount of energy released is sufficient to prevent pressure reaching the low-low actuation setpoint, subsequent SRV actuations can be completely prevented. If not, the settings will delay reopening by virtue of the longer time required to repressurize the reactor. This allows additional time for any high water leg created in the SRV discharge line after valve actuation to return to (or fall below) its normal water level, minimizing the effects of subsequent discharge thrust loads on the discharge lines. The effects of pressure loads on the suppression pool structural components are limited by preventing the need for subsequent actuations or reducing the actuations to fewer SRVs. SRV actuation is required in support of mitigating a variety of postulated accident and transient events.

The low-low set logic system (EIIS:RV) consists of two channels with separate initiating logic, each opens a separate relief valve (Channel A opens relief valve MS-RV-71D and Channel B opens MS-RV-71F). The logic is armed by actuation of any SRV upon detection of SRV discharge line pressure (indicating a lifted SRV) in combination with a high reactor pressure scram signal. Each channel receives arming signals directly from four of the eight SRV discharge line pressure switches and a signal from the associated division of the Reactor Protection System for the high reactor pressure scram signal. Upon actuation, the arming circuit seals-in and remains established until manually reset. Actuation of either arming logic will seal-in both channels. Once the low-low set logic is armed, the opening and closure pressure setpoints for MS-RV-71D and F are lowered and broadened to occur over a wider pressure range. Contact set M2-T2 of relays (EIIS:RLY) MS-REL-K20A (for Channel A) and MS-REL-K20B (for Channel B) are required to close to complete the low-low set logic arming function. It was identified that these contacts were not being tested as part of the required 18 month Logic System Functional Test (LSFT) surveillance for this function (Surveillance Requirement 3.3.6.3.5 for Function 2 of Table 3.3.6.3-1 of CNS Technical Specifications).

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EVENT DESCRIPTION

CNS Technical Specification Surveillance Requirement (SR) 3.3.6.3.5 requires the completion of a LSFT every 18 months to demonstrate the low-low set logic function (Table 3.3.6.3-1 Function 2). According to the Technical Specification definition of LSFT, testing includes "all required relays and contacts, trip units, solid state logic elements, etc.) of a logic circuit." Contact set M2-T2 of relays K20A and K20B perform a required low-low set arming function.

Prior to January 12, 2000, either Surveillance Procedure 6.SRV.301 or 6.SRV.303 was allowed to be performed to satisfy SR 3.3.6.3.5. The discussion section of procedure 6.SRV.301 noted that it was not required to be performed when procedure 6.SRV.303 is performed. Additionally, the discussion section of procedure 6.SRV.303 noted that procedure 6.SRV.301 is not required to be performed when 6.SRV.303 is performed.

Procedure 6.SRV.303, which had been used to perform this surveillance since June 12, 1995, does not test contact set M2-T2 of relays K20A and K20B. It does test other contact sets of these relays but failed to confirm the "to close" function of contact set M2-T2. Testing of the M2-T2 contact set is adequately demonstrated in procedure 6.SRV.301. This condition was identified during a recent forced outage. As an immediate action, procedure 6.SRV.301 was performed January 12, 2000 to satisfy the LSFT Surveillance Requirement for both relays. Procedure 6.SRV.303 was placed on administrative hold pending revision to properly address the surveillance requirement.

In 1993, Surveillance Procedures 6.3.2.2 (currently numbered 6.SRV.301) and 6.2.2.2.7 (currently numbered 6.SRV.303) were first linked to allow either procedure to satisfy the Low-Low Set logic functional test requirement of CNS Technical Specifications. Additional steps were added to procedure 6.2.2.2.7 to satisfy the Low-Low Set logic functional test requirement (procedure 6.3.2.2 was deemed adequate). Upon revising procedure 6.2.2.2.7, either could be used to satisfy the surveillance requirements, i.e., the definition of LSFT testing in Technical Specifications in 1993 did not explicitly identify the need to test all required contacts.

In 1994 CNS completed an LSFT review. This review was performed to confirm required contacts were being tested by a surveillance procedure. For system and circuit configurations within the scope of the review, electrical drawings were gathered and reviewed contact by contact. Contacts were correlated to existing surveillances to confirm their operation was being verified. Low-low set circuit contacts were individually numbered and correlated to applicable surveillance procedure steps. The 1994 project review identified that contact set M2-T2 was not being tested. The required steps were added to Surveillance Procedure 6.3.2.2 and the test was run prior to startup. During implementation of the procedure change process, it was not identified that a similar revision to Surveillance Procedure 6.2.2.2.7 was also required, even though it was clearly

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noted in procedure 6.3.2.2 that procedure 6.2.2.2.7 could satisfy the same Surveillance Requirement. This represents a missed opportunity to identify the need to revise procedure 6.2.2.2.7 (6.SRV.303).

In 1995, the Surveillance Testing Validation Program (STVP) was completed to confirm adequate testing is performed at the component level to satisfy Technical Specifications. This review correctly identified that relays MS-REL-K20A and B were tested by Surveillance Procedures 6.3.2.2 (6.SRV.301) and 6.2.2.2.7 (6.SRV.303). This review did not identify the differences in testing at the relay contact level nor was it intended to do so. The project included specific instruction to review relays "not to the contact level".

In January 2000, during a review of a revision to the Technical Specification pre-startup checklist, it was identified that Surveillance Requirement (SR) 3.3.6.3.5 had not been satisfied since June 12, 1995. This issue was identified by personnel who participated in some of the prior project reviews and procedure revisions, and were knowledgeable of which procedures test contact set M2-T2.

**BASIS OF REPORT**

The condition identified on January 12, 2000, is reportable under the requirements of 10CFR50.73(a)(2)(i)(B) in that CNS was in a condition prohibited by the Technical Specifications. The time interval for performing the required surveillance test exceeded the Technical Specification surveillance interval plus the Limiting Condition for Operation (LCO) required action completion time.

**CAUSE**

The procedure change process in 1994 lacked the appropriate guidance and controls to ensure other surveillance procedures affected by the revision to 6.3.2.2 were identified and corrected.

**SAFETY SIGNIFICANCE**

There is no actual safety significance for failure to adequately test contact set M2-T2 of low-low set logic relays MS-REL-K20A and B. Upon discovery, the contacts were successfully tested per Surveillance Procedure 6.SRV.301. Successful results were expected as two additional contact sets for each relay (M3-T3 and M4-T4) were being routinely tested within the required LSFT surveillance frequency as part of Procedure 6.SRV.303. Operation of these contacts provides high assurance the remaining contacts were also operating. The design of the subject relays is such that the contacts operate off a single armature. Therefore, sticking of a single contact is not likely. Probabilistic Safety Assessment (PSA) analysis of this condition concluded the subject condition has no PSA safety significance.

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Failure of contact set M2-T2 of relay MS-REL-K20A or B to close would prevent arming of the associated low-low set logic for operation of MS-RV-71D or MS-RV-71F, respectively. Failure of the low-low set function does not prevent the associated SRVs, or any other SRVs, from actuating at their normal pressure setpoints.

Actuation of SRVs at their normal pressure setpoints is sufficient to prevent challenges to the reactor coolant system integrity. However, failure of the low-low set function could result in an increased number of SRV actuations and/or SRV actuation against an elevated discharge pipe water level (thrust load) during mitigation of a transient or small break Loss of Coolant Accident. This could increase the challenge to primary containment integrity, and full conformance to Nuclear Regulatory Commission NUREG-0661 requirements for resolution of Mark I Containment issues would not be demonstrated.

This condition does not represent a failure of the low-low set logic as: 1) the contacts in question passed their functional test, and 2) two other contact sets of the same relays have been successfully tested at the required frequency. The low-low set logic does not provide a function which is required to: 1) shut down the reactor and maintain it in a safe shutdown condition; 2) remove residual heat; 3) control the release of radioactive material; or 4) mitigate the consequences of an accident. Therefore, this condition does not represent a Safety System Functional Failure.

**CORRECTIVE ACTIONS**

Immediate Actions:

1. Surveillance Procedure 6.SRV.301 was performed on the day of discovery. The relay tested satisfactorily.
2. Surveillance Procedure 6.SRV.303 was placed on administrative hold.

Actions Completed:

Procedure change process guidance was added in 1996 as an enhancement to address LSFT overlap testing and in 1999 in response to LER 99-005. This guidance was reviewed and deemed sufficient to reduce the probability of a similar LSFT procedure change inadequacy in the future.

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On-going Actions:

In order to address the extent of condition, a review for linked surveillance procedures that may fully satisfy the same LSFT surveillance requirement will be performed. Identified surveillance procedures will be reviewed against the 1994 LSFT project files to confirm they were adequately reviewed to demonstrate contact testing. If not adequately covered in the 1994 review, a separate review using the procedures and electrical drawings will be performed to confirm adequate testing is being performed at the required frequency to meet CNS Technical Specifications. This review will be completed by April 7, 2000.

PREVIOUS EVENTS

1. LER 94-009, Revision 1, "Inadequate Load Shed and Logic System Surveillance Testing Resulting in Inoperability of Safety Systems." This event identified deficiencies in Logic System Functional Testing that resulted in the 1994 LSFT project review. The project review focused on confirming required contacts were covered by a surveillance procedure. The 1994 project review identified the requirement to test contact set M2-T2 and added the required steps to procedure 6.3.2.2 (6.SRV.301). The project did not require the identification of all procedures that could be used to perform contact testing.
2. LER 99-005, "Failure to Adequately Perform Logic System Functional Testing Places Plant in a Condition Prohibited by Technical Specifications." This event identified specific circuit configurations, outside the scope of the 1994 LSFT project review, that require surveillance testing. Corrective actions include confirming adequate testing is being performed for these circuit configurations.

