



Nebraska Public Power District

COOPER NUCLEAR STATION
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CNSS948250

August 11, 1994

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

Dear Sir:

Cooper Nuclear Station Licensee Event Report 94-013 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. H. Mueller
S. J. Jobe
V. L. Wolstenholm
R. E. Wilbur
D. A. Whitman
INPO Records Center
NRC Resident Inspector
R. J. Singer
CNS Training
CNS Quality Assurance

160073

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PDR ADOCK 05000298
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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.

FACILITY NAME (1)
COOPER NUCLEAR STATIONDOCKET NUMBER (2)
05000298PAGE (3)
1 OF 4TITLE (4) Reactor Scram and Group Isolations Due to Spurious Trip of Reactor Vessel Level
Instruments Caused by Leaking Solenoid Valve in the Reference Leg Injection System

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
07	12	94	94	-- 013 --	00	08	11	94	FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)							
POWER LEVEL (10)	0	20.402(b)	20.405(c)	<input checked="" type="checkbox"/>	50.73(a)(2)(iv)	73.71(b)			
		20.405(a)(1)(i)	50.36(c)(1)		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
B	JC	FSV	V030	N					

SUPPLEMENTAL REPORT EXPECTED (14)

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

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

On July 12, 1994, at 2:45 am, a Reactor Scram and Group 2 (Shutdown Cooling), 3 (Reactor Water Cleanup), and 6 (Reactor Building Ventilation) Isolations occurred and Standby Gas Treatment started as a result of a spurious decrease in the indicated Reactor vessel water level on the "B" channel level instruments. Actual vessel level was at 50 inches. All control rods were at the full in position, thus no rod motion occurred. The Scram was reset at approximately 2:49 am, and Shutdown Cooling returned to operation at 3:04 am. Reactor coolant temperature increased from approximately 110 to 113 degrees Fahrenheit while Shutdown Cooling was isolated.

The cause of the spurious actuation was leakage through a solenoid valve due to wear. This solenoid valve provides injection of Core Spray to backfill the "B" channel reference leg of the Reactor vessel water level indication system. The wear was due to pressure transients from valve surveillance testing in the Core Spray system, which was not anticipated during installation. The valve was replaced and, along with the comparable solenoid valve for the "A" reference leg, was checked satisfactorily for leakage. The system line-up will be changed to isolate the solenoid valves from the Core Spray system during normal operation, and Core Spray system testing will be revised to minimize the potential for pressure transients.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
COOPER NUCLEAR STATION	05000298	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 OF 4
		94	-- 013 --	00	

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

A. Event Description

On July 12, 1994, at 2:45 am, a Reactor Scram and Group 2 (Shutdown Cooling), 3 (Reactor Water Cleanup), and 6 (Reactor Building Ventilation) Isolations occurred and Standby Gas Treatment started as a result of a decrease in the indicated Reactor vessel water level on the "B" channel level instruments. "B" channel indicated level decreased to approximately 0 inches, corresponding to 164 inches above top of active fuel. Actual vessel level was at 50 inches. All control rods were at the full in position, thus no rod motion occurred. Immediately following this actuation, the "B" channel level instruments indicated upscale. The Scram was reset at approximately 2:49 am, and Shutdown Cooling returned to operation at 3:04 am. Reactor Coolant temperature increased from approximately 110 to 113 degrees Fahrenheit while Shutdown Cooling was isolated. At approximately 3:43 am, the "B" channel level indicated approximately the same as the "A" and "C" channel indications.

Investigation into this event revealed several minor level perturbations in the 11 days prior to the Scram, starting with the replacement of NBI-PS-102C, Reactor High Pressure Switch (Recirculation Pump Trip and Alternate Rod Insertion Actuation). This pressure instrument is located on the same reference leg as the "B" channel level instruments. The largest of these level perturbations occurred on July 7, 1994, when the narrow range level recorder showed a decrease of approximately 38 inches, followed by an upscale condition. This and previous perturbations were erroneously attributed to air introduced into the instrument lines during the replacement of NBI-PS-102C.

Investigation following the July 12 Scram revealed that CS-MOV-MO26B had been cycled shortly before both the July 12 Scram and the perturbation of July 7. The only physical connection between the CS system and the reference leg 3B instruments is the CS reference leg injection line. This line is normally isolated by solenoid valve NBI-SOV-SSV739. SSV739 was removed, disassembled, and inspected. The valve showed signs of wear on internal parts and a frayed seat ring.

B. Plant Status

Shutdown, vented, with Reactor Coolant System temperature of 110 degrees Fahrenheit, and the Residual Heat Removal system in the Shutdown Cooling mode of operation.

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FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
COOPER NUCLEAR STATION	05000298	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	3 OF 4
		94	-- 013 --	00	

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

C. Basis for Report

Actuation of Engineered Safety Features systems, reportable in accordance with 10CFR50.73(a)(2)(iv).

D. Cause

NBI-SOV-SSV739 is rarely operated, and the wear found would not be expected from normal operation. Root cause investigation indicates that the condition of the valve is due to pressure transients from the surveillance testing of CS-MOV-M026B with the Reactor depressurized. The solenoid valve is designed to use process system pressure to assist in obtaining a tight shutoff, a condition which is not attainable with the Reactor depressurized. The selection of this valve design for the system did not appropriately anticipate the spectrum of operational conditions to which it could be exposed when the equipment was installed in 1989.

A contributing factor is air in portions of the instrument lines due to the configuration of the Core Spray and Core Spray reference leg injection systems. Motor-operated valve surveillance testing of the Core Spray system strokes CS-MOV-M026B without the Core Spray pump operating, creating a vacuum which results in air being drawn into the system prior to pressure maintenance restoring system pressure. With NBI-SOV-SSV739 leaking by, this air is entrained in the reference leg injection flow path, subsequently introducing it into the instrument lines.

E. Safety Significance

Although not expected, the actuation had minimal impact on plant operation, since the Reactor had been shutdown for 48 days and the decay heat load was significantly reduced. All equipment was verified to have performed as expected upon the actuation. The temperature rise due to the loss of Shutdown Cooling was minimal.

F. Safety Implications

A loss of Shutdown Cooling would be more significant when the decay heat load was higher than at this time. Plant procedures direct the actions to be taken in the event Shutdown Cooling is lost. Since the level perturbations were of short duration, resetting the actuators and restoring Shutdown Cooling could be accomplished without delay, resulting in minimal heat-up of the Reactor coolant.

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TEXT CONTINUATION

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FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (4)
COOPER NUCLEAR STATION	05000298	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	4 OF 4
		94	-- 013 --	00	

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

F. Safety Implications (Continued)

During normal operations, two check valves in series, together with reactor pressure acting on the solenoid valve, isolate the Core Spray reference leg injection system from the Reactor Coolant System. Thus, the leakage which caused the actuations would not occur during normal operations.

G. Corrective Action

NBI-SOV-SSV739 was replaced with an identical valve and, along with the comparable solenoid valve for the "A" reference leg, was checked satisfactorily for leakage. Guidance was developed to backfill the reference legs to minimize air in the instrument lines. Both solenoid valves were isolated from the Core Spray system using local manual valves in accordance with equipment clearance procedures. Permanent changes will be implemented to isolate the solenoid valves since they are required only for a narrow spectrum of off-normal events, and local access is possible under the expected conditions. A change to the Core Spray valve testing procedure will be processed to reduce the potential for inducing pressure transients as a result of testing methodology.

H. Similar Events

LER 91-011, RPS and ESF Trips due to Spurious Trip of two RPS Reactor Water Level Instruments Caused by an Air Bubble at the Instrument Reference Leg Tap, discusses a similar incident. The cause of this event was attributed to air or water leaking through this solenoid valve as a result of procedural deficiencies associated with the performance of Local Leak Rate Testing (LLRT) of the CS System. Procedures were revised to ensure that no air remained in the CS system upon completion of the LLRT. No corrective actions were taken to inspect or repair the valve.

Supplemental Information

NBI-SOV-SSV739 is a 1/2 inch IPS solenoid operated gate valve manufactured by Valcor Engineering Corp, Model V526-5940, Part No. 13314.