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NLS2006048
July 20, 2006

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

Subject: Licensee Event Report No. 2006-004-00
Cooper Nuclear Station, NRC Docket 50-298, DPR-46

The purpose of this correspondence is to forward a Licensee Event Report.

Sincerely,

Stewart B. Minahan
General Manager of Plant Operations

/em

Enclosure

cc: Regional Administrator w/enclosure
USNRC - Region IV

Cooper Project Manager w/enclosure
USNRC - NRR Project Directorate IV-1

Senior Resident Inspector w/enclosure
USNRC - CNS

NPG Distribution w/enclosure

INPO Records Center w/enclosure

SORC Administrator w/enclosure

SRAB Administrator w/enclosure

CNS Records w/enclosure

COOPER NUCLEAR STATION
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NRC FORM 366A (1-2001)

U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REVISION	
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17. NARRATIVE *(If more space is required, use additional copies of Form 366A)*

4. TITLE
Manual Reactor Scram and Containment Group 2 Isolation due to Plant Air Failure

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
05	22	2006	2006	-004	00	07	20	2006	FACILITY NAME	DOCKET NUMBER

9. OPERATING MODE
1

10. POWER LEVEL
100

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)

☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(i)(C)	☐ 50.73(a)(2)(vii)
☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☒ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(C)	☐ OTHER
☐ 20.2203(a)(2)(vi)	☐ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME	TELEPHONE NUMBER (Include Area Code)
Paul V. Fleming, Licensing Manager	(402) 825-2774

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
B	LF	PMC	ZR 160	Y					

14. SUPPLEMENTAL REPORT EXPECTED	15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR
☐ YES (If yes, complete EXPECTED SUBMISSION DATE). ☒ NO				

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

At 0651 on May 22, 2006, Service Air (SA) pressure began lowering for an unknown reason. Additional Service Air Compressors (SAC's) could not be started in time to recover SA pressure. Following a rapid power reduction the reactor was manually scrammed at 0701 as a mitigating action. All automatic systems functioned as expected, and the plant entered and remained in Mode 3, Hot Shutdown. This event was not risk significant. Analysis revealed the most likely cause to be the SAC automatic control system failed to respond to system pressure changes. SAC's were placed in local control mode to operate independently based on individual start-stop-unload setpoints. The plant subsequently started up on May 24, 2006. The cause was a single point failure mode introduced into the newly installed SAC compressor controller that was unrecognized in the design process. A standing order now prevents SAC's from operation in other than local control until an evaluation of failure modes on the automatic control system has been performed. Action remaining includes revising applicable plant configuration change procedures to perform failure mode evaluation for Maintenance Rule (MR) Risk Significant control systems; revising the SAC operating procedure to normally operate in local mode, except when controlled methods retain at least two SAC's to supply plant air; determining which of the past three years plant modifications require a failure mode evaluation; and performing evaluations for those modifications.

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PLANT STATUS

Cooper Nuclear Station (CNS) was at 100% power in Mode 1 at the time of the event.

BACKGROUND

The Plant Air System is comprised of both the Service Air (SA) System [EIIS:LF] and the Instrument Air (IA) System [EIIS:LD]. SA System includes three air compressors [EIIS:CMP], air receivers [EIIS:RCV], and other equipment necessary to generate the compressed air supply to the SA distribution header and the IA Dryers [EIIS:DRY]. Air compressors are rotary type compressors rated to deliver 822 cfm at 125 psig. Each compressor is driven by a 480 VAC motor. Compressors A and B are powered from critical buses and Compressor C is powered from a non-critical bus. The three compressors operate in parallel and one of the three will be available on a demand basis with the other two in standby mode ready to operate as required. Compressor operation is controlled by a control system [EIIS:PMC] that brings additional units on-line when operating units reach a fully loaded condition and there is a further increase in demand. Normally, one air compressor will maintain sufficient pressure in the air receivers to provide the desired instrument air header pressure. The second and third compressors serve as standby units. Actuation of standby units is automatic.

A plant modification had provided for replacement of antiquated, unreliable reciprocating air compressors to provide air to the Plant Air Systems. In addition, the controls for operation of the air compressors were upgraded to provide higher overall reliability, reduced maintenance labor, and simplified operation. The Plant Air System provides a normal air supply to essential operating instrumentation and valves and serves the operational needs for motive and maintenance air of the plant on a continuous basis.

EVENT DESCRIPTION

At 0651 on May 22, 2006, SA pressure began lowering for an unknown reason. Additional Service Air Compressors (SAC's) could not be started in time to recover SA pressure. A rapid power reduction was performed, and at 0701, the reactor was manually scrammed as a mitigating action due to lowering SA pressure. All control rods fully inserted and a Group 2 isolation occurred due to low Reactor Vessel level as expected immediately following the scram. Minimum reactor level during the scram was noted to be 20 inches below Instrument Zero. Steady shutdown conditions were achieved with reactor level restored to its normal range being controlled by the Feedwater System and reactor pressure at 900 psig being controlled by Steam Bypass Valves to the Main Condenser. All automatic systems functioned as expected, and the plant remained in Mode 3, Hot Shutdown, while the cause of the SA pressure lowering was investigated.

Based on the post-trip analysis of SAC operation, the loss of Plant Air was most likely caused by the integrated portion of the SAC automatic control system failing to respond to system pressure changes. Consequently, the compressors were placed in local control mode to operate independently based on their individual start-stop-unload setpoints. This results in all 3 air compressors running with "B" SAC loading and unloading to control SA pressure, and with 'A' and 'C' SAC's running unloaded. The plant was subsequently started up on May 24, 2006.

BASIS FOR REPORT

Both the actuation of Reactor Protection System (RPS) and the Group 2 isolation are reportable under 10 CFR 50.73(a)(2)(iv), System Actuation.

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SAFETY SIGNIFICANCE

This condition is not risk significant, because design mitigation capabilities dependent on critical air remained available to support safety functions for the duration of the condition and as a result of prompt local operator action to restore air header pressure. In addition, the transition from online full power conditions to shutdown occurred without further equipment or human error complications.

This condition did not challenge a fuel, reactor coolant pressure, primary containment, or secondary containment boundary. The condition did not impact the plant's ability to safely shut down or maintain the reactor in a safe shutdown condition.

Therefore, the impact of this condition is considered negligible. As a result, the event is bounded by the baseline PSA model and has negligible risk significance.

CAUSE

A single point failure mode was introduced into the newly installed compressor controller for the SAC that was unrecognized in the CNS design process.

CORRECTIVE ACTION

The following actions have been completed.

1. SAC control has been placed in local control mode to operate independently based on the individual SAC start-stop-unload setpoints to prevent recurrence of this event.

2. A standing order was put in place on June 29, 2006 that prevents SAC's from being operated in other than local control until an engineering evaluation of failure modes on the automatic control system has been performed. Exceptions are limited to formal troubleshooting or other methods that retain at least 2 SAC's, permanent or temporary, to supply plant air and are not controlled by the automatic control system.

The following corrective actions are being tracked in the CNS corrective action program.

1. Revise applicable CNS configuration and control procedures to perform failure mode evaluation of plant configuration changes for Maintenance Rule Risk Significant control systems. Examples of acceptable methodologies for digital control systems refer to EPRI Topical Reports TR-102348 and TR-108831. Examples of acceptable methodologies for other systems include standard failure mode evaluation assessment, functional fault tree analysis, or cause-consequences analysis.

2. Revise the SAC operating procedure such that the SAC's are normally operated in local mode, except when testing, formal troubleshooting or other controlled methods are used that retain at least two SAC's, permanent or temporary, to supply plant air not controlled by automatic mode.

3. Based upon Maintenance Rule Risk Significance, determine which of the past three years of installed plant modifications require a failure mode evaluation, and perform a failure mode evaluation for those modifications as required.

4. Based upon Maintenance Rule Risk Significance, determine which of the plant modifications currently in work or completed but not installed require a failure mode evaluation, and perform a failure mode evaluation for those modifications as required.

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PREVIOUS EVENTS

None

Correspondence Number: **NLS2006048**

The following table identifies those actions committed to by Nebraska Public Power District (NPPD) in this document. Any other actions discussed in the submittal represent intended or planned actions by NPPD. They are described for information only 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	COMMITMENT NUMBER	COMMITTED DATE OR OUTAGE
None		