Nebraska Public Power District
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NLS2008102
November 24, 2008

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

Subject: Licensee Event Report No. 2008-002-00
Cooper Nuclear Station, Docket No. 50-298, DPR-46

Dear Sir or Madam:

The purpose of this correspondence is to forward Licensee Event Report 2008-002-00.

Sincerely,

Demetrius L. Willis
General Manager of Plant Operations

/bk

Attachment

cc: Regional Administrator w/attachment
USNRC - Region IV

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

Senior Resident Inspector w/attachment
USNRC - CNS

SRAB Administrator w/attachment

NPG Distribution w/attachment

INPO Records Center w/attachment

SORC Chairman w/attachment

CNS Records w/attachment

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IE22
NRR

NRC FORM 366 (9-2007) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104 EXPIRES 08/31/2010

Estimated burden per response to comply with this mandatory information collection request: 80 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by Internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means to impose 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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4. TITLE
Technical Specification Prohibited Condition Due to Safety Relief Valve Test 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
										05000
07	07	2008	2008	- 002 -	00	11	24	2008	FACILITY NAME	DOCKET NUMBER
										05000

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)
David W. Van Der Kamp, Licensing Manager	(402) 825-2904

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	SB	RV	T020	N					

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)*

During safety relief valve (SRV) as-found testing, performed July 7 through July 9, 2008, by Wyle Laboratories, one of eight Target Rock SRV pilot valve assemblies failed to lift within its Technical Specification (TS) lift set point of 1100 +/- 33.0 psig. The SRV lifted at 1165 psig. Two subsequent lifts were performed and were within the TS pressure set point tolerance. This testing was performed to satisfy the TS surveillance for SRV pilot valve assemblies removed during Refueling Outage 24. Cooper Nuclear Station (CNS) was in Mode 1 at 100% power at the time of the discovery. The remaining SRV pilot valve assemblies tested within their TS lift set point tolerances.

A subsequent inspection of the failed SRV pilot valve assembly revealed corrosion bonding, a recurring problem at CNS and in the industry, was the failure mechanism for the high lift pressure. The performance of the two-stage Target Rock pilot-actuated valves in the current design application has not been successful in meeting the as-found lift test requirements contained within the current CNS TS.

This event is considered to have negligible safety significance.

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

PLANT STATUS

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

BACKGROUND

The pressure relief system includes three American Society of Mechanical Engineers (ASME) code safety valves [EIIS: SB] and eight safety relief valves (SRVs) [EIIS: RV], all of which are located on the main steam lines [EIIS: SB] within the drywell [EIIS: NH], between the reactor vessel [EIIS: RPV] and the first main steam isolation valve [EIIS: ISV]. The safety valves provide protection against over pressurization of the nuclear system and discharge directly into the interior space of the drywell. The safety relief valves discharge to the suppression pool and provide three main functions: over pressurization relief operation to prevent safety valve opening, overpressure safety operation to prevent nuclear system over pressurization, and depressurization operation (opened automatically or manually) as part of the emergency core cooling system [EIIS: BJ, BM, BO]. The nominal set pressure and tolerances for these valves are established in CNS Technical Specification (TS) Surveillance Requirement (SR) 3.4.3.1.

The SRVs installed at CNS are Target Rock Model 7567F, two-stage, pilot-actuated valves with pilot assemblies comprised of Stellite 21 pilot discs and Stellite 6B pilot body seats.

During Refueling Outage (RFO) 24, two complete SRVs and six SRV pilot assemblies were removed from the plant and replaced with refurbished certified spares. The SRVs removed from service were shipped to Wyle Laboratories for required surveillance testing.

EVENT DESCRIPTION

On July 7 through July 9, 2008, two complete SRVs and six SRV pilot assemblies removed during RFO 24 were as-found tested at Wyle Laboratories, Inc. As-found pressure set point testing of one SRV pilot assembly (serial number 1244) exceeded the TS limit. This SRV pilot assembly was formerly installed in functional location MS-RV-71BRV.

The pressure set point of this SRV pilot assembly is 1100 psig. The TS SR 3.4.3.1 as-found limit of acceptance is +/- 33.0 psig (1067 psig to 1133 psig), a +/- 3% band. The first actual safety lift pressure of this SRV pilot assembly was recorded as 1165 psig, approximately 5.9% above the set point. Subsequent lift tests of the same pilot assembly were at 1111 psig and 1109 psig; both within 3% of the pressure set point. Six of the remaining seven SRVs and SRV pilot assemblies tested satisfactory for the as-found set pressure tests. One SRV pilot assembly had an invalid test due to an unsecured air source inadvertently applied to the air operator. It was determined the SRV pilot assembly would have lifted within the TS limit based on performance of subsequent lifts within the set point limit and review of historical test data which showed no failures for this pilot assembly since 1997.

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

The affected SRV pilot assembly is not currently installed in the plant. All eight SRV pilot assemblies installed during RFO 24 were refurbished and certified to lift within +/-1% of as-left set point acceptance criteria prior to installation. Therefore, all currently installed SRVs are capable of performing their intended function.

An inspection of the seat and disc area of the failed SRV pilot assembly was performed. The inspection confirmed the failure mechanism for the high lift pressure was corrosion bonding between the Stellite 21 pilot disc and Stellite 6B pilot body seat. SRV corrosion bonding is an industry-wide issue which has been previously reported by CNS and evaluated within the CNS corrective action program. Past corrective actions include replacement of the SRV pilot valve assemblies with certified SRV pilot valve assemblies containing Stellite 21 pilot discs instead of Stellite 6B pilot discs; implementation of the Target Rock Users Group industry best practices for SRV refurbishment, including installation of a new Stellite 21 pilot disc during each refurbishment, and CNS Engineering oversight during SRV refurbishment.

These past corrective actions have mitigated but not eliminated failures due to corrosion bonding. In RFO 23, all eight SRV pilot assemblies installed, including serial number 1244, were refurbished with new Stellite 21 pilot discs. This population of SRV pilot assemblies was removed during RFO 24 after a full 18-month cycle of operation and subsequently as-found tested. SRV pilot assembly serial number 1244 failed its initial lift test. This was the first as-found testing performed on a full complement of SRV pilot assemblies with new Stellite 21 discs.

BASIS FOR REPORT

This event is being reported as an operation or condition prohibited by plant Technical Specifications per 10 CFR 50.73(a)(2)(i)(B).

Reportability of this event was initially missed due to non-conservative interpretation of NUREG 1022 Revision 2, Event Reporting Guidelines 10 CFR 50.72 and 50.73, Section 3.2.2. Specifically, guidance provided in Example 3 of Section 3.2.2 was interpreted to mean the condition was not reportable on the basis that only one SRV pilot assembly had failed. This performance deficiency was identified as a Severity Level IV Nuclear Regulatory Commission identified violation. The Licensee Event Report (LER) for this event is due no later than 60 days from September 29, 2008, that is, November 28, 2008.

SAFETY SIGNIFICANCE

This event is considered to have negligible safety significance. An SRV opening at 1165 psig is bounded by the assumed opening pressure of 1210 psig utilized in the reload licensing reports for Cooper Nuclear Station RFO 23, cycle 24, and of RFO 24, cycle 25. This event does not create a core damage scenario. There is no change in core damage frequency (CDF) or large early release frequency. This event did not compromise overpressure protection for the reactor pressure vessel. Even under postulated failure conditions of a single relief valve, the CDF impact would be negligible.

CAUSE

This mechanistic failure was caused by corrosion bonding. The performance of the two-stage Target Rock pilot-actuated valves in the current design application has not been successful in meeting the as-found lift test requirements contained within the current CNS TS.

CORRECTIVE ACTIONS

The following corrective actions have been entered into CNS' corrective action program:

1. Prepare a design document to determine how many of the eight SRVs must function to ensure plant safety.

2. Prepare and submit a TS license amendment request to allow one or two SRV failures during the SRV as-found TS lift testing as determined by the approved design document.

PREVIOUS EVENTS

LER 2007-002-00 – On February 28 through March 2, 2007, the results of Target Rock SRV tests performed at Wyle Laboratories identified that one of eight SRV pilot valve assemblies failed to lift within its TS lift set point of 1090 +/- 32.7 psig. The failure was a result of sufficient corrosion bonding between the SRV pilot valve assembly Stellite 21 disc and the pilot valve Stellite 6B body seat to cause the SRV pilot valve to lift outside its TS set point tolerance.

LER 2005-002-00 – On May 16 and May 19, 2005, a review of Target Rock SRV test data, provided by Wyle Laboratories, determined that three of eight SRV pilot valve assemblies failed to lift within their TS lift set point. Examination determined that sufficient corrosion bonding existed between the SRV pilot valve assembly Stellite 21 disc and the pilot valve Stellite 6B in-body seat to cause the SRV pilot valves to lift outside TS set point tolerances.

LER 2003-002-00 – On May 19, 2003, a review of Target Rock SRV test data, provided by Wyle Laboratories, determined that four of eight SRV pilot valve assemblies failed to lift within their TS lift set point. Examination determined that sufficient corrosion bonding existed between the SRV pilot valve assembly Stellite 21 disc and the pilot valve Stellite 6B in-body seat to cause the SRV pilot valves to lift outside TS set point tolerances.

ATTACHMENT 3 LIST OF REGULATORY COMMITMENTS©

Correspondence Number: NLS2008102

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		