



Nebraska Public Power District

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NLS2019007
January 24, 2019

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

Subject: Licensee Event Report No. 2017-004-01
Cooper Nuclear Station, Docket No. 50-298, DPR-46

Dear Sir or Madam:

The purpose of this correspondence is to forward Licensee Event Report 2017-004-01.

There are no new commitments contained in this letter.

Sincerely,

John Dent, Jr.
Vice President Nuclear-
Chief Nuclear Officer

/jo

Attachment: Licensee Event Report 2017-004-01

cc: Regional Administrator w/attachment
USNRC - Region IV

NPG Distribution w/attachment

Cooper Project Manager w/attachment
USNRC - NRR Plant Licensing Branch IV

INPO Records Center w/attachment
via ICES entry

Senior Resident Inspector w/attachment
USNRC - CNS

SORC Chairman w/attachment

SRAB Administrator w/attachment

CNS Records w/attachment

IEZZ
NRR



LICENSEE EVENT REPORT (LER)

(See Page 2 for required number of digits/characters for each block)

(See NUREG-1022, R 3 for instruction and guidance for completing this form
<http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/>)

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Information Services Branch (T-2 F43), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to Infocollects.Resource@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 used 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.

1. FACILITY NAME

Cooper Nuclear Station

2. DOCKET NUMBER

05000298

3. PAGE

1 of 4

4. TITLE

Torus to Drywell Vacuum Breaker Failure to Indicate Full Closed Causes Loss of Safety Function

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET
06	19	2017	2017	004	01	01	24	2019	FACILITY NAME	DOCKET
										05000
									FACILITY NAME	DOCKET
										05000

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

1	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)
	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)
	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)
	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)
10. POWER LEVEL	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)
	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> 73.77(a)(1)
	<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input checked="" type="checkbox"/> 50.73(a)(2)(v)(D)	<input type="checkbox"/> 73.77(a)(2)(i)
	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> 73.77(a)(2)(ii)
		<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> OTHER Specify in Abstract below or in NRC Form 366A	

12. LICENSEE CONTACT FOR THIS LER

LICENSEE CONTACT: Jim Shaw, Licensing Manager TELEPHONE NUMBER (Include Area Code): (402) 825-2788

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

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
				Y					

14. SUPPLEMENTAL REPORT EXPECTED

YES (If yes, complete 15. EXPECTED SUBMISSION DATE) NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

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

On June 19, 2017, during performance of surveillance 6.PC.207, the control switch for vacuum breaker PC-AOV-NRV21 was cycled open then closed. When the control switch was taken to close, the vacuum breaker failed to indicate closed. Operations declared Primary Containment (PC) and PC-AOV-NRV21 inoperable and entered Technical Specification (TS) Limiting Condition for Operation (LCO) 3.6.1.1 Condition A and LCO 3.6.1.8 Condition B at 21:15 hours. In addition, TS LCO 3.6.1.1 Condition B was entered at 22:15 hours due to PC-AOV-NRV21 still indicating intermediate. The control switch for PC-AOV-NRV21 was cycled open, and then closed a second time. At this time, PC-AOV-NRV21 indicated closed. Operations declared PC and PC-AOV-NRV21 operable at 23:11 hours and exited TS LCO 3.6.1.1, Condition A and Condition B, and TS LCO 3.6.1.8, Condition B.

Two potential causes were identified during troubleshooting activities. The first is increased internal friction in the valve air operator of the vacuum breaker could cause the operator to close too slowly and limit the ability to fully close. The second is the solenoid operated valve (SOV) could bleed vented air off slowly causing the vacuum breaker to not fully close. Both the valve air operator and the SOV were replaced during troubleshooting activities.

There were no safety consequences associated with this condition.



**LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET**

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1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Cooper Nuclear Station	05000- 298	2017	- 004	- 01

NARRATIVE

PLANT STATUS

Cooper Nuclear Station (CNS) was in Mode 1, Power Operations, 100 percent power, at the time of discovery; i.e., June 19, 2017.

BACKGROUND

The function of the Torus to Drywell Vacuum Breaker [EIS:VACB] is to relieve vacuum in the drywell. There are 12 internal vacuum breakers which allow air and steam flow from the suppression chamber (torus) to the drywell when the drywell is at a negative pressure. Torus to Drywell Vacuum breakers prevent an excessive negative differential pressure across the drywell boundary. Each vacuum breaker is a self-actuating valve [EIS:V], similar to a check valve, which can be remotely operated for testing purposes.

A negative differential pressure across the drywell wall is caused by rapid depressurization of the drywell. Design Bases Accident (DBA) analyses assume the vacuum breakers to be closed initially and to remain closed and leak tight, until the suppression pool is at a positive pressure relative to the drywell. The requirement that the vacuum breakers be closed ensures that there is no excessive bypass leakage should a Loss of Coolant Accident (LOCA) occur.

The function of the primary containment [EIS:NH] is to isolate and contain fission products released from the Reactor Primary System following a design basis LOCA and to confine the postulated release of radioactive material. The safety design basis for the primary containment is that it must withstand the pressures and temperatures of the limiting DBA without exceeding the design leakage rate. The leakage from the drywell to the suppression chamber must be limited to ensure the pressure suppression function is accomplished and the suppression chamber pressure does not exceed design limits.

The vacuum breaker has a safety function in the closed position to limit the amount of bypass flow to ensure proper containment response on a postulated LOCA event and an open safety function post LOCA to limit negative differential pressure between the drywell and the suppression chamber. With the valve partially open, the LOCA containment response cannot be assured.

EVENT DESCRIPTION

On June 19, 2017, during performance of surveillance 6.PC.207, "Torus to Drywell Vacuum Breaker Operation," the control switch for vacuum breaker PC-AOV-NRV21 was cycled open, then closed. When the control switch was taken to close, the vacuum breaker failed to indicate closed. As such, Operations declared Primary Containment and PC-AOV-NRV21 inoperable and entered Technical Specification (TS) Limiting Condition for Operation (LCO) 3.6.1.1 Condition A and LCO 3.6.1.8 Condition B at 21:15 hours. In addition, TS LCO 3.6.1.1 Condition B was entered at 22:15 hours due to PC-AOV-NRV21 still indicating intermediate.



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Cooper Nuclear Station	05000- 298	2017	- 004	- 01

NARRATIVE

The control switch for PC-AOV-NRV21 was cycled open, then closed a second time. At this time, PC-AOV-NRV21 indicated closed. Operations declared Primary Containment operable at 23:11 hours and exited TS LCO 3.6.1.1, Condition A and Condition B, and TS LCO 3.6.1.8 Condition B.

BASIS FOR REPORT

CNS is reporting this event under 10 CFR 50.73(a)(2)(v)(D) as a condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident.

CNS also reported this event to the Nuclear Regulatory Commission Operations Center per Event Notification 52813.

CNS subsequently performed an engineering evaluation which concluded that PC-AOV-NRV21 would have completed its closure under forces resulting from reactor blowdown. As such, this event is not considered a Safety System Functional Failure.

SAFETY SIGNIFICANCE

There were no safety consequences associated with this condition. With the vacuum breaker closed, all blowdown flow would be directed under the suppression pool water level, consistent with the assumptions in the Licensing Basis Accident Analyses.

Once closed, the vacuum breaker design provides increasing seal pressure and leak tightness on increasing drywell pressure. Bypass leakage would have been less than the one inch diameter limit demonstrated by the most recent surveillance tests. Critical containment parameters including peak wetwell pressure, peak drywell and wetwell structural temperatures, and peak suppression pool temperatures would remain within the design limits.

CAUSE

A specific cause of the vacuum breaker failing to close could not be determined at the time of the event due to the inability to access the vacuum breaker. Troubleshooting was performed during Refueling Outage 30 (RE30). PC-AOV-NRV21 was cycled open and closed three times during troubleshooting. The vacuum breaker cycled smoothly and consistently each time with no discrepancies recorded, thus a direct cause for PC-AOV-NRV21 failing to indicate closed was not identified. Two potential causes were identified.



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NARRATIVE

The first potential cause is increased internal friction in the valve operator of the vacuum breaker could cause the operator to close too slowly and limit the ability of the operator to fully close. Although during troubleshooting the valve operator responded satisfactorily, it was replaced, as there was not enough evidence to refute this as a possible cause of failure.

The second potential cause is if the solenoid operated valve (SOV), which controls air supply to the pneumatic cylinder located on the top of the valve assembly, slowly or partially changes state, vented air from the operator could bleed off slowly causing the vacuum breaker to not fully close. During troubleshooting, the SOV responded satisfactorily. However, it was observed that it was an older model and a search back to 2001 showed no maintenance had been performed on this SOV. This SOV was replaced with the same series of SOV as installed on the other torus to drywell vacuum breakers.

CORRECTIVE ACTIONS

Following the event on June 19, 2017, personnel ensured that PC-AOV-NRV21 was not disturbed in the closed state. A Caution tag was assigned to the valve selector switch to maintain the closed position. The instrument air valves that supply air to the pneumatic operation were Danger tagged closed to isolate air and disable any possible opening action.

The valve air operator and the solenoid operated valve were replaced during troubleshooting activities performed during RE30.

PREVIOUS EVENTS

There have been no events reported in the last three years related to torus to drywell vacuum breaker operation.