**Nebraska Public Power District**

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NLS2016069
November 22, 2016

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

Subject: Licensee Event Report No. 2016-004-00
Cooper Nuclear Station, Docket No. 50-298, DPR-46

Dear Sir or Madam:

The purpose of this correspondence is to forward Licensee Event Report 2016-004-00.

There are no new commitments contained in this letter.

Sincerely,

Oscar A. Limpias
Vice President Nuclear-
Chief Nuclear Officer

/jo

Attachment: Licensee Event Report 2016-004-00

cc: Regional Administrator w/attachment
USNRC - Region IV

Cooper Project Manager w/attachment
USNRC - NRR Plant Licensing Branch IV-2

Senior Resident Inspector w/attachment
USNRC - CNS

SRAB Administrator w/attachment

NPG Distribution w/attachment

INPO Records Center w/attachment
via ICES entry

SORC Chairman w/attachment

CNS Records w/attachment

IE22
NRR

**COOPER NUCLEAR STATION**
*P.O. Box 98 / Brownville, NE 68321-0098*
***Telephone:** (402) 825-3811 / **Fax:** (402) 825-5211*
www.nppd.com

NRC FORM 366 (11-2015) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 10/31/2018

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 FOIA, Privacy and Information Collections Branch (T-5 F53), 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.

# 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/)

| 1. FACILITY NAME | 2. DOCKET NUMBER | 3. PAGE |
|---|---|---|
| Cooper Nuclear Station | 05000298 | 1 of 4 |

**4. TITLE**

Closure of Multiple Main Steam Isolation Valves due to High Flow Signal

| 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 |
| | | | | | | | | | | 05000 |
| 09 | 25 | 2016 | 2016 | 004 | 00 | 11 | 22 | 2016 | FACILITY NAME | DOCKET 05000 |

| 9. OPERATING MODE | 11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply) | | | |
|---|---|---|---|---|
| 3 | ☐ 20.2201(b) | ☐ 20.2203(a)(3)(i) | ☐ 50.73(a)(2)(ii)(A) | ☐ 50.73(a)(2)(viii)(A) |
| | ☐ 20.2201(d) | ☐ 20.2203(a)(3)(ii) | ☐ 50.73(a)(2)(ii)(B) | ☐ 50.73(a)(2)(viii)(B) |
| | ☐ 20.2203(a)(1) | ☐ 20.2203(a)(4) | ☐ 50.73(a)(2)(ii) | ☐ 50.73(a)(2)(ix)(A) |
| | ☐ 20.2203(a)(2)(i) | ☐ 50.36(c)(1)(i)(A) | ☒ 50.73(a)(2)(iv)(A) | ☐ 50.73(a)(2)(x) |
| | ☐ 20.2203(a)(2)(ii) | ☐ 50.36(c)(1)(ii)(A) | ☐ 50.73(a)(2)(v)(A) | ☐ 73.71(a)(4) |
| **10. POWER LEVEL** | ☐ 20.2203(a)(2)(iii) | ☐ 50.36(c)(2) | ☐ 50.73(a)(2)(v)(B) | ☐ 73.71(a)(5) |
| 000 | ☐ 20.2203(a)(2)(iv) | ☐ 50.46(a)(3)(ii) | ☐ 50.73(a)(2)(v)(C) | ☐ 73.77(a)(1) |
| | ☐ 20.2203(a)(2)(v) | ☐ 50.73(a)(2)(i)(A) | ☐ 50.73(a)(2)(v)(D) | ☐ 73.77(a)(2)(i) |
| | ☐ 20.2203(a)(2)(vi) | ☐ 50.73(a)(2)(i)(B) | ☐ 50.73(a)(2)(vii) | ☐ 73.77(a)(2)(ii) |
| | | ☐ 50.73(a)(2)(i)(C) | ☐ OTHER Specify in Abstract below or in NRC Form 366A | |

**12. LICENSEE CONTACT FOR THIS LER**

| LICENSEE CONTACT | TELEPHONE NUMBER (Include Area Code) |
|---|---|
| Jim Shaw, Licensing Manager | (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 |
|---|---|---|---|---|---|---|---|---|---|---|
| D | NH | ISV | | Y | | | | | | |

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


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

On September 24, 2016, at 20:40 hours, during reactor cooldown for Refueling Outage 29, Cooper Nuclear Station control room operators closed the inboard Main Steam Isolation Valves (MSIV) to minimize steam flow to control the reactor cooldown rate. Reactor pressure was controlled using the Main Steam Line Drains; and the condensate/feed system was available for reactor water level control.

On September 25, 2016, at 01:03 hours, while equalizing pressure across the MSIVs to below 200 psid, a differential pressure of 190 psid was established. Upon opening MS-AO-80A, a Group 1 isolation was immediately received due to a Main Steam Line high flow signal. The control room operators subsequently equalized pressure and successfully opened MS-AO-80A, as well as the remaining MSIVs, at 18:52 hours.

The cause of the event was insufficient procedure guidance exists regarding limitations on opening the MSIVs. To correct this, the applicable procedure has been revised to change the differential pressure limitations for opening MSIVs from 200 psid to 80 psid.

The safety significance of the event is low and did not pose a threat to the health and safety of the public.

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| 1. FACILITY NAME | 2. DOCKET NUMBER | 3. LER NUMBER | | |
|---|---|---|---|---|
| | | YEAR | SEQUENTIAL NUMBER | REV NO. |
| Cooper Nuclear Station | 05000- 298 | 2016 | - 004 | - 00 |

NARRATIVE

## PLANT STATUS

Cooper Nuclear Station was in Mode 3, Hot Shutdown, at approximately 330 psig, at the time the condition was identified.

## BACKGROUND

The Main Steam system conducts steam from the reactor vessel, via four steam lines, through the Primary Containment to the Main Steam Turbine. Each steam line has two, normally open, Main Steam Isolation Valves (MSIVs) [EIIS:ISV], one inside and one outside the Primary Containment. The MSIVs close automatically upon receipt of certain isolation signals to prevent damage to the fuel cladding by limiting the loss of reactor water during a steam line break outside Primary Containment and also to limit the release of radioactive materials in case of a major leak from Primary Containment.

Main Steam Line (MSL) Flow-High is provided to detect a break of the MSL and to initiate closure of the MSIVs. If the steam were allowed to continue flowing out of the break, the reactor would depressurize and the core could uncover. If the Reactor Pressure Vessel (RPV) water level decreases too far, fuel damage could occur. Therefore, the isolation is initiated on high flow to prevent or minimize core damage. The MSL high flow trip setting was selected high enough to permit the isolation of one MSL for test at rated power without causing an automatic isolation of the rest of the steam lines yet low enough to permit early detection of a steam line break.

The MSL flow signals are initiated from 16 differential pressure switches [EIIS:PDIS] that are connected to the four MSLs. The differential pressure switches are arranged such that, even though physically separated from each other, all four connected to one MSL would be able to detect the high flow.

## EVENT DESCRIPTION

On September 24, 2016, at 20:40 hours, during reactor cooldown for Refueling Outage 29, Operations closed the inboard MSIVs to minimize steam flow to control the reactor cooldown rate in accordance with the Normal Shutdown procedure. Reactor pressure was controlled using the main steam line drains. The condensate/feed system was available for reactor water level control.

On September 25, 2016, at 01:03 hours, when Operations utilized the Main Steam procedure to equalize pressure across the MSIVs to below 200 psid, a differential pressure (DP) of approximately 190 psid was established. When MS-AO-80A was opened, a Group 1 Isolation was immediately received. All open MSIVs, as well as the MSL Drain Isolation Valves MS-MO-74 and MS-MO-77, closed. The Group 1 isolation was caused by a MSL high flow signal on MSL 'A' as the valve was opening. This was a valid signal based on a review of the steam flow indication for MSL 'A'.

Upon investigation it was discovered that the Differential Pressure Indicating Switches (DPIS) for the MSL 'A' high flow signal have a setpoint of 105.8 psid, with a calibration tolerance of +/- 3 psid. The DPIS' measure DP created by flow through the flow element upstream of the MSIV. Therefore, with static DP across the closed MSIVs, at approximately 190 psid prior to opening MS-AO-80A, it was possible that the DPIS' would exceed their setpoint as the MSIV opened and the DP was transferred to

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the flow element in MSL 'A'. To ensure another Group 1 isolation would not occur, the MSIV DP would have to be below the lowest possible setpoint of the DPIS' (approximately 100 psid).

In order to provide margin below the setpoint for the Group 1 isolation, Operations determined that the DP across the MSIVs would be reduced to 75 psid prior to opening the MSIVs.

To increase the reactor cooldown rate and lower RPV pressure, Operations began to blow down using Reactor Water Cleanup to Radwaste. Reactor cooldown was also increased by starting Reactor Core Isolation Cooling in pressure control mode.

Operations isolated the steam supply to gland steam, High Pressure (HP) turbine cylinder heating, and the Reactor Feed Pump Turbine HP stop valve above the seat drains, bringing the main steam equalizing header pressure up to approximately 118 psig, and the DP across the MSIVs down to approximately 65 psid. At 18:52 hours, MS-AO-80A was successfully opened and the remaining MSIVs were subsequently opened.

## BASIS FOR REPORT

This condition is reportable in accordance with 10 CFR 50.73(a)(2)(iv)(A) as any event or condition that resulted in manual or automatic actuation of any of the systems listed in paragraph (a)(2)(iv)(B) of this section, except when.....(1) the actuation resulted from and was part of a pre-planned sequence during testing or reactor operation; or (2) the actuation was invalid and the system properly removed from service or with the safety function already completed.

## SAFETY SIGNIFICANCE

The occurrence of the Group 1 isolation signal did not compromise safety systems required to mitigate the consequences of an accident or transient. At the time of the event, the reactor vessel was at approximately 330 psig with all control rods previously inserted as part of the shutdown process. All high pressure and low pressure emergency core cooling systems were operable. The isolation signal was a main steam line high flow, however, no steam leak or break was observed. The plant response to the isolation was as expected. The safety significance of the event is low and did not pose a threat to the health and safety of the public.

## CAUSE

The apparent cause was insufficient procedure guidance exists regarding limitations on opening the MSIVs.

## CORRECTIVE ACTIONS

The applicable procedure has been revised to change the DP limitation for opening an MSIV from 200 psid to 80 psid.

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**NARRATIVE**

PREVIOUS EVENTS

There have been no automatic or manual system actuations in the past three years.