



**Nebraska Public Power District**

*"Always there when you need us"*

NLS2010003  
January 8, 2010

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

Subject: Licensee Event Report No. 2009-004-00  
Cooper Nuclear Station, Docket No. 50-298, DPR-46

Dear Sir or Madam:

The purpose of this correspondence is to forward Licensee Event Report 2009-004-00.

Sincerely,

Demetrius L. Willis  
General Manager of Plant Operations

/bk

**Attachment**

cc: Regional Administrator w/attachment USNRC - Region IV	NPG Distribution w/attachment
Cooper Project Manager w/attachment USNRC - NRR Project Directorate IV-1	INPO Records Center w/attachment
Senior Resident Inspector w/attachment USNRC - CNS	SORC Chairman w/attachment
SRAB Administrator w/attachment	CNS Records w/attachment

TE22  
NRR

## LICENSEE EVENT REPORT (LER)

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

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.

## 1. FACILITY NAME

Cooper Nuclear Station

## 2. DOCKET NUMBER

05000298

## 3. PAGE

1 of 4

## 4. TITLE

Manual Reactor Scram for Digital Electro-Hydraulic Fluid Leak

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																																				
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10. POWER LEVEL																																														
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## 12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME

David Van Der Kamp, Licensing Manager

TELEPHONE NUMBER (Include Area Code)

(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	MANUFACTURER	REPORTABLE TO EPIX
A	TG	PCV	W120	Y					

## 14. SUPPLEMENTAL REPORT EXPECTED

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

## 15. EXPECTED

SUBMISSION  
DATE

MONTH DAY YEAR

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

On November 11, 2009, at 17:43 Central Standard Time, Cooper Nuclear Station (CNS) control room operators inserted a manual reactor scram after a non-isolable digital electro-hydraulic (DEH) fluid leak developed. This was the same governor valve (GV) and fitting location that had leaked November 6, 2009, and required a forced plant shutdown. After the scram, all control rods inserted and automatic systems responded as expected.

Inspection of the governor valve fitting found that the face O-ring installed five days earlier was not the correct size for the application and did not seal appropriately. This O-ring was acquired from a turbine generator tool box and was not added to the work order to document its use. CNS maintenance replaced the O-rings on all electro-hydraulic fittings for GVs with new ones from warehouse inventory.

The root causes were a failure to follow the material control and warehouse issuing processes and ineffective management of the initial repair to the DEH fluid leak five days prior. CNS will use management processes to reinforce expectations for procedure compliance and will implement case study training on this event. CNS will also inventory the turbine generator tool box and remove any materials that are not in compliance with the procedure for in-process material control.

This event was not risk significant.

# LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

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Cooper Nuclear Station	05000298	YEAR	SEQUENTIAL NUMBER	REVISION	2 of 4
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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, Power Operations, at approximately 15% power when the reactor was manually scrammed. The station was ascending in power after completion of Forced Outage 09-01.

## BACKGROUND

The power conversion systems at CNS are designed to produce electrical energy through conversion of a portion of thermal energy contained in the saturated steam supplied from the reactor, condense the turbine exhaust steam into water, and return the water to the reactor as heated feedwater. The saturated steam produced by the reactor is passed through the high pressure turbine [EIS:TRB] where the steam is expanded and then exhausted through the moisture separators [EIS:MSR]. The moisture separators reduce the moisture content of the steam to close to zero percent. The steam is then passed through the low pressure turbines where the steam is again expanded. From the low pressure turbines, the steam is exhausted into the condenser [EIS:COND] where the steam is condensed and de-aerated and then returned to the cycle as condensate.

The main turbine [EIS:TA] consists of a high pressure section and a low pressure section comprised of two turbines in tandem. Steam from the reactor is admitted to the high pressure turbine section through two main stop valve and governor valve assemblies [EIS:PCV]. After expansion through the high pressure turbine section, steam flows to four moisture separators and returns to the low pressure turbine section by passing through four sets of combined intermediate valves (intercept valves and reheat stop valves combined into one assembly) (EIS:ISV). These intermediate valves, fully open during normal operation, limit or isolate steam flow from the moisture separators to the low pressure turbines under certain conditions. This action will prevent potential damage to the low pressure turbines.

The turbine utilizes a Digital Electro-Hydraulic (DEH) [EIS:TG] system to control reactor pressure by positioning governor valves and condenser bypass valves. It consists of solid state governing devices, governor, startup control devices, emergency devices for turbine and plant protection (overspeed governor, master trip, vacuum trip, motoring protection, thrust bearing wear trip, low bearing oil pressure trip) and special control and test devices. The control system operates the main stop valves, governor valves, bypass valves, reheat stop and intercept valves and other protective devices. DEH system oil pressure is maintained by two hydraulic pumps [EIS:P] located at the DEH reservoir tank [EIS:T].

## EVENT DESCRIPTION

At 13:35 Central Standard Time on November 11, 2009, the control room received an alarm indicating low fluid level in the DEH reservoir tank. CNS was at approximately 67% power at the time of the alarm. The condition was investigated and found to be caused by a DEH fluid leak coming from a fitting on the governor valve #3 (GV-3) control block. This is the same governor valve (GV) and fitting location that leaked five days earlier on November 6, 2009, and required a forced plant shutdown (Forced Outage 09-01). All 12 existing GV electro-hydraulic

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

(EH) swaged joint connections were replaced with modified fittings (three per GV) and O-rings on November 7, 2009.

The leak rate was low enough to allow reservoir level to be restored by adding fluid periodically; however, the leak was determined to be non-isolable. Control room operators lowered reactor power, manually tripped the turbine at 17:28, and inserted a manual reactor scram at 17:43. All control rods fully inserted and automatic systems responded as expected.

Maintenance disassembled the fitting on GV-3 and found the face O-ring was damaged. Further investigation identified that the O-ring was not the correct size for the application. It had a larger cross-sectional diameter and could not be compressed into the O-ring groove. This discrepancy prevented metal-to-metal contact of the fitting faces and resulted in the O-ring trying to seal a larger gap, which over time could not contain system pressure and began to leak.

CNS determined through subsequent investigation that the O-ring for GV-3 was not issued from controlled warehouse inventory; rather, a CNS instrument and control (I&C) technician acquired the O-ring from a turbine generator tool box maintained by the I&C shop. Additionally, the individual did not have the O-ring added to the work order parts list to document its use. This was a violation of the process for control of material that is not stored in or controlled by the warehouse and not installed in plant systems. All O-rings for the other governor valve fittings were issued from warehouse inventory.

On November 12, 2009, maintenance replaced the O-rings on the GV-3 EH fittings with ones from warehouse inventory. Additionally, maintenance replaced the O-rings on the other GV EH fittings.

## BASIS FOR REPORT

This event is reportable under 10 CFR 50.73(a)(2)(iv)(A) as an event that resulted in actuation of systems listed in paragraph (a)(2)(iv)(B); specifically, (a)(2)(iv)(B)(1) for a reactor protection system actuation resulting in a reactor scram. The event was reported as Event Notification Number 45489.

## SAFETY SIGNIFICANCE

This event has negligible safety significance. There was no impact to structures, systems, or components that were needed to achieve safe shutdown, or mitigate the potential accidents, transients, and special events described in the CNS Updated Safety Analysis Report. This event resulted in negligible increase to the core damage frequency reflected in the base model of the CNS probabilistic risk assessment.

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

The root cause was a violation of the in-process material control and warehouse issuing processes. This resulted in the wrong O-ring being installed on the face of the fitting which did not allow the fitting to seal as designed. Additionally, management failed to take ownership of, and manage the response to repair the November 6, 2009, DEH fluid leak when it became known that it would require more than a maintenance activity to resolve it.

**CORRECTIVE ACTION**

CNS will use management processes to reinforce expectations for compliance with site procedures and will develop and implement case study training on this event for management, maintenance, engineering, and outage organization personnel.

CNS will also inventory the turbine generator tool box and remove any materials that are not in compliance with the procedure for in-process material control.

**PREVIOUS EVENTS**

As noted in the Event Description, a DEH leak occurred on November 6, 2009. CNS intended to take the turbine off-line to repair the DEH leak, but not shut down the reactor. After the turbine was tripped, a low water level transient occurred and a manual reactor scram was inserted.

CNS identified that an originally installed swaged joint on the DEH supply line for GV-3 was installed crooked. Additionally, the actuator bracket for GV-3 was missing a stop bolt that normally would restrict movement of the DEH supply line in response to flow-induced vibrations. The higher than normal vibration at low power caused the DEH swaged joint to both loosen and fracture. CNS replaced all the GV EH swaged connection joints with a modified fitting, replaced the missing stop bolt, and inspected all other bolts and brackets on all GVs.

This event was reported as Licensee Event Report 2009-002 on December 30, 2009.

Correspondence Number: NLS2010003

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		