Nebraska Public Power District
"Always there when you need us"

NLS2009108
December 30, 2009

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

Subject: Licensee Event Report No. 2009-002-00
Cooper Nuclear Station, Docket No. 50-298, DPR-46

Dear Sir or Madam:

The purpose of this correspondence is to forward Licensee Event Report 2009-002-00.

Sincerely,

R. D. Kruse FOR DEET Willis

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

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

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)

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

4. TITLE
Manual Scram On Low Water Level Caused By Turbine Trip From 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
										05000
11	06	2009	2009	- 002 -	00	12	30	2009	FACILITY NAME	DOCKET NUMBER
										05000

9. OPERATING MODE
1

10. POWER LEVEL
020

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 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
A	TG	PCV	W120	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)*

On November 6, 2009, at 19:30 Central Standard Time, Cooper Nuclear Station (CNS) control room operators inserted a manual reactor scram when vessel water level lowered quickly after a turbine trip. The turbine had been tripped after a hydraulic fluid leak developed in the digital electro-hydraulic (DEH) turbine control system that could not be isolated and repaired with the turbine on-line. After the scram, all control rods inserted and automatic systems responded as expected. A Group 2 isolation occurred due to reactor low water level conditions. Vessel water level was subsequently recovered and the Group 2 isolation was reset.

The leak was caused by higher than normal vibration of the DEH supply line for governor valve #3 (GV-3) at low power. CNS repaired the leak by replacing the swaged joint connection that had fractured with a modified fitting. Additionally, a missing stop bolt for the actuator bracket on GV-3, that would have restrained the DEH supply line, was replaced.

The root cause was deficient workmanship. CNS will add a step in the applicable preventive maintenance plans for the governor valves to ensure that the support bolting for the valve actuator bracket is installed.

This event was not risk significant.

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REVISION	
Cooper Nuclear Station	05000298	2009	- 002	- 000	2 of 4

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

PLANT STATUS

Cooper Nuclear Station (CNS) was in Mode 1, Power Operation, at approximately 20% power when the reactor was manually scrammed. The station was ascending in power after completion of Refueling Outage 25 (RFO-25).

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 [EIIS:TRB] where the steam is expanded and then exhausted through the moisture separators [EIIS: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 [EIIS:COND] where the steam is condensed and de-aerated and then returned to the cycle as condensate.

The main turbine [EIIS: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 [EIIS: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) (EIIS: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) [EIIS: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 [EIIS:P] located at the DEH reservoir tank [EIIS:T].

EVENT DESCRIPTION

At 18:31 Central Standard Time on November 6, 2009, during power ascension from RFO-25, the control room received an alarm indicating abnormal DEH fluid level in the reservoir tank. CNS was at approximately 31% power at the time of the alarm. Operators were dispatched to investigate the leakage and refill the DEH tank. A leak was found on piping near governor valve #3 (GV-3).

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REVISION	
Cooper Nuclear Station	05000298	2009	- 002	- 000	3 of 4

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

When it was determined the DEH leak could not be isolated, control room operators (CROs) decided to take the turbine off line for repairs while keeping the reactor at power. CROs lowered reactor power to approximately 20% and removed the main turbine from service at 19:28 utilizing the station procedure for turbine generator operation.

After the turbine was tripped, reactor vessel water level lowered and approached the low level scram set point. At 19:30, CROs inserted a manual reactor scram when reactor water level unexpectedly lowered below 12 inches on the narrow range instruments as the reactor feedwater system was not appropriately lined up for a manual turbine trip. All control rods fully inserted. Per design, a Group 2 isolation occurred when water level reached 3 inches on the narrow range instruments. After the scram, the water level continued to lower to -24 inches on the wide range instruments. Using the reactor feedwater system, reactor vessel water level was restored to the normal level band in a slow manner to minimize the effect on the reactor vessel cool down rate because of low levels of decay heat in the fuel. At 20:10 the Group 2 isolation was reset.

Inspection of the DEH system after the leak and reactor scram found that it occurred in one of the supply lines to the control block for GV-3. The line was split at the swaged joint on the control block and a stop bolt on the actuator bracket for GV-3 that normally would restrict movement of the DEH supply line was missing. GV-3 had been replaced in April of 2008 and the stop bolt was not replaced during GV-3 reassembly at that time. CNS further identified, as part of the root cause evaluation, that the swaged joint on the DEH supply line was installed crooked; likely during original installation. With the stop bolt missing, the DEH tubing vibrated more than usual during the low power condition causing the swaged joint to loosen and fracture.

On November 7, 2009, maintenance personnel replaced all 12 existing governor valve (GV) electro-hydraulic connections with a modified fitting. Additionally, maintenance personnel replaced the missing stop bolt for the actuator bracket on GV-3 and inspected all other bolts and brackets on all GVs.

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 the reactor protection system actuation resulting in a reactor scram and (a)(2)(iv)(B)(2) for the primary containment isolation signal (Group 2). The event was reported as Event Notification Number 45482.

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 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.

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REVISION	
Cooper Nuclear Station	05000298	2009	- 002	- 000	4 of 4

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

CAUSE

The root cause was deficient workmanship. Two deficient workmanship events combined to allow the swaged joint to fail. The first event was improper installation of the joint. The second event was in April 2008, where the GV-3 actuator bracket stop bolt, that restrains the pressurized DEH line, was not replaced during reassembly.

The contributing cause for the reactor vessel level transient was that the turbine generator operation procedure was deficient with respect to turbine trip instructions at low power. CNS resolved this deficiency by revising the post turbine trip actions in the procedure.

CORRECTIVE ACTION

CNS will add a step in the applicable preventive maintenance plans for the GVs to ensure the support bolting for the valve actuator bracket is installed.

PREVIOUS EVENTS

There are no related previous events.

ATTACHMENT 3 LIST OF REGULATORY COMMITMENTS©[4]

Correspondence Number: NLS2009108

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		