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OPPD
Omaha Public Power District

Fort Calhoun Station
9610 Power Lane
Blair, NE 68008

LIC-10-0030
May 3, 2010

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

Reference: Docket No. 50-285

Subject: Licensee Event Report 2009-005 Revision 1 for the Fort Calhoun Station

Please find attached Licensee Event Report 2009-005, Revision 1, dated May 3, 2010. This report is being submitted pursuant to 10CFR50.73(a)(2)(i)(B). There are no commitments contained in this submittal.

If you should have any questions, please contact me.

Sincerely,

Jeffrey A. Reinhart
Site Vice President

JAR / epm

Attachment

c: E. E. Collins, NRC Regional Administrator, Region IV
L. E. Wilkins, NRC Project Manager
J. C. Kirkland, NRC Senior Resident Inspector
INPO Records Center

IE22
NRR

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

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

Estimated burden per response to comply with this mandatory collection request: 80 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send 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 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 reverse for required number of digits/characters for each block)

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
Fort Calhoun Station	05000285	1 OF 4

4. TITLE

Inoperable Auxiliary Feedwater Train Due to an Inoperable Injection Valve

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 NUMBER
11	6	2009	2009	- 005 -	01	5	3	2010		05000
									FACILITY NAME	05000

9. OPERATING MODE

5

10. POWER LEVEL

0

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)	X 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)*
Erick Matzke	402-533-6855

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

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 November 6, 2009, during performance of air operated valve diagnostic testing of HCV-1107A (Steam Generator 'A' auxiliary feedwater (AFW) inlet valve), the air regulator setting was found to be 23.6 pounds per square inch gauge (psig). The regulator pressure setting of 23.6 psig is contrary to the required nominal setting of 35 psig credited in calculation FC06904, "Category 1 Air-Operated Valve (AOV) Operator Margin Analysis." (HCV-1107A is an air-to-close valve.)

The root causes of this event were determined to be:

The most probable root cause of this event is that in 2006 a technician, who knew the standard practice was to set the regulator a minimum of 5 psig greater than the highest benchset, set the regulator at the wrong pressure. The technician noted the benchset flowscan on October 27, 2006, was 17.91 psig and set the regulator to 22.91 psig (nearly 23 psig). This adjustment was not covered by a written instruction.

The latent root cause of this event was the adjustment would have been an action not covered by any existing retrievable written instructions. The fundamental flawed assumptions and weak work practice reflected the cultural norms and values that existed in the Instrumentation and Control maintenance organization in 2006.

The air regulator for HCV-1107A was reset from 23.6 psig to 35 psig.

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NARRATIVE

BACKGROUND

Fort Calhoun Station (FCS) is a two-loop Combustion Engineering (CE) design reactor coolant system (RCS). Each loop has one steam generator (SG) and two reactor coolant pumps (RCPs). Each SG has one main feedwater (MFW) nozzle and one auxiliary feedwater (AFW) nozzle. The MFW nozzle is the normal path for feeding the SGs.

The AFW system is provided for storage, pumping and delivery of makeup water to the SGs in order to remove decay heat if the MFW system is not available. The AFW system consists of one emergency feedwater storage tank; one safety-related motor-driven (FW-6), one safety-related turbine-driven (FW-10) AFW pump; one non-safety-related, diesel-driven AFW pump (FW-54); one non-safety-related diesel fuel oil transfer pump with a day tank; non-safety-related fuel oil piping and valves; remotely operated flow control valves; interconnecting piping to the MFW system and piping to the AFW nozzles on the SGs.

The AFW line to each SG has an isolation valve on the inside of containment (the 'A' valves) and one on the outside of containment (the 'B' valves). The HCV-1107A/B valves are the isolation valves for the 'A' SG. The HCV-1108A/B valves are the isolation valves for the 'B' SG. The AFW isolation valves are 3-inch, pneumatically operated globe valves. These valves are air to close and spring to open.

FW-54 is the startup AFW pump. FW-54 takes its suction from the condensate storage tank and discharges to the normal feedwater header. FW-54 and its associated equipment are not safety-related.

The AFW system provides a redundant means of supplying one or both SGs with feedwater. Operation of the safety-related portion of the AFW system is automatically initiated on a low SG water level or manually initiated as follows:

- Automatic initiation via an auxiliary feedwater actuation signal (AFAS).
- Automatic start signals to the safety-related pumps (FW-6 and FW-10).
- Manual initiation from the control room.
- Manual initiation from alternate shutdown panel for FW-10 and the AFW injection valves and locally for FW-6.

The system is designed to add feedwater to either or both SGs under any condition, including the loss of all electrical power along with the loss of the MFW system and the loss of the main steam piping downstream of the main steam isolation valves. The AFW system fulfills both safety-related and non-safety-related functions.

Technical Specification (TS) 2.5, "Steam and Feedwater Systems," states, in part:

(1) Two AFW trains shall be OPERABLE when Tcold is above 300 (degrees) F.

A. With one steam supply to the turbine driven AFW pump inoperable, restore the steam supply to OPERABLE status within 7 days and within 8 days from discovery of failure to meet the LCO.

B. With one AFW train inoperable for reasons other than condition A, restore the AFW train to OPERABLE status within 24 hours.

C. If the required action and associated completion times of condition A or B are not met, then the unit shall be placed in MODE 2 in 6 hours, in MODE 3 in the next 6 hours, and less than 300 (degrees) F without reliance on the steam generators for decay heat removal within the next 18 hours.

EVENT DESCRIPTION

On November 1, 2009, FCS began a refueling outage. The station entered mode 5 (less than 210 degrees F, refueling) on November 2, 2009. On November 6, 2009, during performance of air operated valve diagnostic testing of HCV-1107A, the air regulator setting was found to be 23.6 pounds per square inch gauge (psig). The regulator pressure setting of 23.6 psig is contrary to the required nominal setting of 35 psig credited in calculation FC06904, "Category 1 Air-Operated Valve (AOV) Operator Margin Analysis." (HCV-1107A is an air-to-close valve.) A root cause analysis was initiated to determine the cause of the apparent failure of the valve. By December 12, 2009, the causal analysis had progressed to the point where it was concluded that the valve's regulator had been inadvertently set to the wrong pressure setting during a previous refueling outage.

HCV-1107A has a safety-related function to shut to isolate AFW flow to a SG as well as to open to allow AFW flow to a SG. With the valve regulator set to 23.6 psig, HCV-1107A was unable to perform its design safety function for longer than the TS allowed outage time.

Based on the root cause analysis, the date of discovery for this report was determined to be December 12, 2009, instead of the date of the test on November 6, 2009. This event is being reported pursuant to 10 CFR 50.73(a)(2)(i)(B).

CONCLUSION

In the fall of 2006 FCS conducted a SG replacement refueling outage. On September 11, 2006, work order (WO) 218003/01 paperwork was issued to remove and install the valve operator for HCV-1107A per the applicable portions of procedure PE-RR-VX-0414S, "Inspection and Repair of Safety Related Fisher 'HSC' Valves." An "As Found" flowscan of HCV-1107A was performed on September 11, 2006. This identified that the input pressure was adjusted slightly greater than 35 psig. The stem coupling and regulator from HCV-1107A were removed on September 12, 2006, for storage. An as found diagnostic test (Flowscan) was performed on HCV-1107A and its actuator. (Flowscan is a diagnostic device and methodology used to perform baseline or diagnostic testing on AOV and their actuators.) When HCV-1107A was reinstalled, the "As Left" Flowscan dated October 27, 2006, identified that the input pressure to the flow scanner was adjusted to slightly greater than 23 psig.

In the period of time between the flowscan of September 11, 2006, and the flowscan of October 27, 2006, the air regulator for HCV-1107A setting was reset to 23.6 psig instead of 35 psig as specified. There is no record of any activity during those dates that would have changed the regulator setting from the required 35 psig to 23.6 psig. The plant records do not show any maintenance on the regulator for HCV-1107A prior to September 11, 2006, or after November 2, 2006.

The as-left setting of the air regulator for HCV-1107A at 23.6 psig went undetected by station personnel until the performance of AOV diagnostic testing of HCV-1107A on November 6, 2009. The regulator pressure setting of 23.6 psig is contrary to the required nominal setting of 35 psig credited in calculation FC06904, "Category 1 Air-Operated Valve (AOV) Operator Margin Analysis."

The root causes of this event were determined to be:

1. The most probable root cause of this event is that in 2006 an Instrument and Controls (I&C) technician, who knew the standard practice was to set the regulator a minimum of 5 psig greater than the highest benchset, set the regulator at the wrong pressure. The I&C technician noted the benchset flowscan on October 27, 2006, was 17.91 psig and set the regulator to 22.91 psig (nearly 23 psig). This adjustment was not covered by a written instruction.

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NARRATIVE

2. The latent root cause of this event was the adjustment would have been an action not covered by any existing retrievable written instructions. The fundamental flawed assumptions and weak work practice reflected the cultural norms and values that existed in the I&C maintenance organization in 2006.

CORRECTIVE ACTIONS

The air regulator for HCV-1107A was reset from 23.6 psig to 35 psig. Additional actions will be administered by the corrective action system.

SAFETY SIGNIFICANCE

HCV-1107A is a normally closed, air-to-close / spring-to-open valve. This valve has a safety function to open to allow AFW flow to an intact steam generator and to close to NOT feed a failed / depressurized steam generator. The valve fails open upon loss of DC power to the solenoid valve, or upon loss of the air supply. However, the valve has an air accumulator installed to permit three (open and closed) cycles in 8 hours after loss of the normal air supply. Based on the as-found regulator setting of 23.6 psig, it was determined that, even when positioned "closed", HCV-1107A would remain approximately 28 percent open. During power operations HCV-1107A would not have isolated AFW flow to Steam Generator RC-2A by itself. However, the redundant containment isolation valve HCV-1107B, located in Rm 81, was capable of isolating AFW flow to RC-2A if needed during design basis accident conditions. Past surveillance tests and maintenance history showed that HCV-1107B has been reliable. The ability to adequately remove decay heat via the steam generators was not adversely impacted. Therefore this event has a minimal impact on the health and safety of the public.

SAFETY SYSTEM FUNCTIONAL FAILURE

This event does not result in a safety system functional failure in accordance with NEI-99-02.

PREVIOUS SIMILAR EVENTS

None

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