Omaha Public Power District
1946 - 2006
Fort Calhoun Station
P.O. Box 550
Fort Calhoun, NE 68023

January 26, 2007
LIC-07-0005

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Station P1-137
Washington, DC 20555

Reference: Docket No. 50-285

Subject: Licensee Event Report 2006-008 Revision 0 for the Fort Calhoun Station

Please find attached Licensee Event Report 2006-008, Revision 0, dated January 26, 2007. This report is being submitted pursuant to 10 CFR 50.73(a)(2)(v)(B). If you should have any questions, please contact me.

Sincerely,

Jeffrey A. Reinhart
Site Director
Fort Calhoun Station

JAR/epm

Attachment

c:
B. S. Mallett, NRC Regional Administrator, Region IV
Alan Wang, NRC Project Manager
J. D. Hanna, NRC Senior Resident Inspector
INPO Records Center

IE22

NRC FORM 366 (6-2004) U.S. NUCLEAR REGULATORY COMM

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 06/30/2007

Estimated burden per response to comply with this mandatory collection request: 50 hours. 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 3

4. TITLE

Loss of Shutdown Cooling Due to Repressurizing Reactor Coolant System

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
										05000
11	27	2006	2006	- 008 -0	00	01	26	2007	FACILITY NAME	DOCKET NUMBER 05000

9. OPERATING MODE

4

10. POWER LEVEL

0

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

- ☐ 20.2201(b)
- ☐ 20.2201(d)
- ☐ 20.2203(a)(1)
- ☐ 20.2203(a)(2)(i)
- ☐ 20.2203(a)(2)(ii)
- ☐ 20.2203(a)(2)(iii)
- ☐ 20.2203(a)(2)(iv)
- ☐ 20.2203(a)(2)(v)
- ☐ 20.2203(a)(2)(vi)
- ☐ 20.2203(a)(3)(i)
- ☐ 20.2203(a)(3)(ii)
- ☐ 20.2203(a)(4)
- ☐ 50.36(c)(1)(i)(A)
- ☐ 50.36(c)(1)(ii)(A)
- ☐ 50.36(c)(2)
- ☐ 50.46(a)(3)(ii)
- ☐ 50.73(a)(2)(i)(A)
- ☐ 50.73(a)(2)(i)(B)
- ☐ 50.73(a)(2)(i)(C)
- ☐ 50.73(a)(2)(ii)(A)
- ☐ 50.73(a)(2)(ii)(B)
- ☐ 50.73(a)(2)(iii)
- ☐ 50.73(a)(2)(iv)(A)
- ☐ 50.73(a)(2)(v)(A)
- ☒ 50.73(a)(2)(v)(B)
- ☐ 50.73(a)(2)(v)(C)
- ☐ 50.73(a)(2)(v)(D)
- ☐ 50.73(a)(2)(vii)
- ☐ 50.73(a)(2)(viii)(A)
- ☐ 50.73(a)(2)(viii)(B)
- ☐ 50.73(a)(2)(ix)(A)
- ☐ 50.73(a)(2)(x)
- ☐ 73.71(a)(4)
- ☐ 73.71(a)(5)
- ☐ OTHER

Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME	TELEPHONE NUMBER (Include Area Code)
Erick Matzke, Compliance Engineer	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 27, 2006, Fort Calhoun Station (FCS) was in Mode 4, cold shutdown, with shutdown cooling (SDC) in service. Reactor coolant system (RCS) temperature was approximately 119F and RCS pressure was approximately 233 pounds per square inch absolute (psia). Reactor Coolant Pumps RC-3A and RC-3B were in service. The pressurizer had maximum heaters and spray flow in service. RC-3B and RC-3A were secured at 1327 central standard time (CST) and 1330 CST, respectively, which reduced the spray flow to the pressurizer. As a result, RCS pressure rose to greater than 250 psia and initiated closure of shutdown cooling isolation valves, HCV-347 and HCV-348. The crew immediately recognized the loss of SDC condition and entered the appropriate abnormal operating procedure. The crew secured the running low pressure safety injection (LPSI) pumps, secured all pressurizer heaters and initiated auxiliary spray to lower RCS pressure. When RCS pressure was less than 250 psia, the crew restored the SDC system to operation.

The root cause of this event was determined to be a mismatch between procedural guidance and crew experience.

The SDC system was returned to operation. Operator training and appropriate procedures are being revised.

BACKGROUND

Cooldown from normal operating temperature (approximately 532F) to below 300F is accomplished by steaming the steam generators (SG) to the condenser or to the atmosphere while maintaining SG inventory. When the reactor coolant temperature is decreased to less than 300F and the reactor coolant system (RCS) pressure is less than 250 pounds per square inch absolute (psia), the shutdown cooling (SDC) system is manually aligned for cooldown. The SDC system consists of the Low Pressure Safety Injection (LPSI) pumps, heat exchangers and associated valves connecting the system to the RCS.

Pressurizer pressure channels operate an inhibit network for HCV-347 "Shutdown Cooling Loop 2 Outboard Isolation Valve" and HCV-348 "Loop 2 To Shutdown Cooling Isolation Valve." The inhibit network consists of a dual interlock conductor and auxiliary relays in the starting circuits of each motor operated valve. If the RCS pressure rises above 250 psia with either of these valves open, both valves will shut automatically. If an operator attempts to open either of the two hot leg suction valves when the pressure in the RCS is above 250 psia, an interlock will prevent opening the valve, and an alarm will actuate in the control room.

EVENT DESCRIPTION

On November 27, 2006, Fort Calhoun Station (FCS) was in Mode 4, cold shutdown, with SDC in service. RCS temperature was approximately 119F and RCS pressure was approximately 233 psia. Two of the four reactor coolant pumps (RCPs), RC-3A and RC-3B, were in service. The pressurizer had maximum heaters and main pressurizer spray flow in service. RC-3B and RC-3A were secured at 1327 central standard time (CST) and 1330 CST respectively which reduced the main spray flow to the pressurizer. As a result, RCS pressure rose to greater than 250 psia and initiated closure of shutdown cooling isolation valves, HCV-347 and HCV-348. The crew immediately recognized the loss of shutdown cooling condition and entered abnormal operating procedure AOP-19, "Loss of Shutdown Cooling." The operators secured the running low pressure safety injection (LPSI) pumps, secured all pressurizer heaters and initiated auxiliary spray to lower RCS pressure. When RCS pressure was less than 250 psia, the crew restored the SDC system to operation. SDC was lost for a total of 12 minutes and RCS temperature rose to 124F. At 1547 an 8-hour notification was made to the NRC Headquarters Operation Office (HOO) pursuant to 10 CFR 50.72(b)(3)(v)(B). This event is being reported pursuant to 10 CFR 50.73(a)(2)(v)(B).

CONCLUSION

The root cause of this event was determined through an in depth investigation. Event trends, alarm printouts, narrative logs, and related procedures were reviewed. Procedural guidance, station policies and departmental expectations were considered. The analysis concluded that the root cause of this event was a mismatch between procedural guidance and crew experience.

The procedures in use at the time of the event, OP-3A "Plant Shutdown," OI-RC-9 "RCP Operation" and OI-RC-7 "RCS Pressure Control Normal Operation" contained guidance to prevent SDC isolation. However, a similar precaution located in OI-RC-7 discussing reduced spray flow with less than four RCPs running, should have been included prior to the step in OP-3A that directs securing the final two RCPs. This would have provided timely information to the control room supervisor (CRS) to monitor RCS pressure and prepare to secure pressurizer heaters and/or initiate auxiliary spray to reduce RCS pressure if necessary upon securing RCPs.

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		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
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NARRATIVE *(If more space is required, use additional copies of NRC Form 366A)* **(17)**

An operational historical review was conducted to determine if this was a first time event or if another crew faced similar conditions. It was discovered that an operating crew on April 30, 2006 had the same plant conditions as at the initiation of this event. The operating margins were identical for both crews. However, repressurization of the RCS did not occur on April thirtieth during the securing of the RCPs because the crew secured all pressurizer heaters 55 minutes prior to securing the RCPs. The securing of the pressurizer heaters for 55 minutes allowed the pressurizer to cool, thus eliminating the possibility of a pressure transient upon securing RCPs.

The contrast between the operating crews lies in the experience level of the crew. The April thirtieth crew had a more experienced CRS and a very experienced reactor operator (RO). The November twenty-seventh operating crew was, by comparison, less experienced. The CRS and ROs assigned to the crew were all licensed in 2004.

Neither the procedural guidance nor crew experience alone could be identified as a root cause through the analysis. However, the combination of these factors formed a mismatch that lead to this event.

CORRECTIVE ACTIONS

As indicated above, plant pressure was immediately reduced and SDC was restored.

Appropriate plant procedures will be revised to include guidance on pressurizer heater operation and the need to initiate auxiliary pressurizer spray flow prior to securing the final two reactor coolant pumps. Discussion of this event will be incorporated into operator training and simulator scenarios. These corrective actions and other enhancements to plant operation will be controlled by the corrective action system.

SAFETY SIGNIFICANCE

The loss of shutdown cooling occurred when both SGs were available to remove decay heat. Although no RCP was in operation, all requirements to start RCPs in each loop were met. The station restored shutdown cooling in twelve minutes and exited Technical Specification (TS) 2.1.1(3)(c). TS 2.1.1(3)(c) states "With no coolant loop IN OPERATION, suspend all operations involving a reduction in boron concentration of the Reactor Coolant System and initiate corrective action to return the required coolant loop to operation in 8 hours." RCS temperature rose 5F during this event. Therefore, this event had very minimal impact on the health and safety of the public.

SAFETY SYSTEM FUNCTIONAL FAILURE

This event does result in a safety system functional failure in accordance with NEI-99-02.

PREVIOUS SIMILAR EVENTS

There have not been any other instances of a similar nature resulting in a loss of SDC at the Fort Calhoun Station in the last three years.