Omaha Public Power District
444 South 16th Street Mall
Omaha NE 68102-2247

April 29, 1996
LIC-96-0052

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

Reference: Docket No. 50-285

Gentlemen:

Subject: Licensee Event Report 96-002 Revision 0 for the Fort Calhoun Station

Please find attached Licensee Event Report 96-002 Revision 0 dated April 29, 1996. This report is being submitted pursuant to 10CFR50.73(a)(2)(iv). If you should have any questions, please contact me.

Sincerely,

T. L. Patterson
Division Manager
Nuclear Operations

TLP/epm

Attachment

c: Winston and Strawn
L. J. Callan, NRC Regional Administrator, Region IV
L. R. Wharton, NRC Project Manager
W. C. Walker, NRC Senior Resident Inspector
INPO Records Center

IE22

NRC FORM 366 (4-95) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 4/30/98

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO THE INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Fort Calhoun Station Unit No. 1	05000285	1 OF 5

TITLE (4)
Manual Reactor Trip Due to Lowering Condenser Vacuum

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
										05000
03	28	96	96	-- 002 --	00	04	29	96	FACILITY NAME	DOCKET NUMBER 05000

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§ (Check one or more) (11)			
POWER LEVEL (10)	30	20.2201(b)	20.2203(a)(2)(v)	50.73(a)(2)(i)	50.73(a)(2)(viii)
		20.2203(a)(1)	20.2203(a)(3)(i)	50.73(a)(2)(ii)	50.73(a)(2)(x)
		20.2203(a)(2)(i)	20.2203(a)(3)(ii)	50.73(a)(2)(iii)	73.71
		20.2203(a)(2)(ii)	20.2203(a)(4)	X 50.73(a)(2)(iv)	OTHER
		20.2203(a)(2)(iii)	50.36(c)(1)	50.73(a)(2)(v)	Specify in Abstract below or in NRC Form 366A
		20.2203(a)(2)(iv)	50.36(c)(2)	50.73(a)(2)(vii)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Laurence P. Lees, Shift Technical Advisor	(402) 533-6971

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS
A	KE	HX	F175	YES						

SUPPLEMENTAL REPORT EXPECTED (14)			EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)	X	NO				

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

On March 29, 1996, the Fort Calhoun station was conducting a plant shutdown because of a condenser tube leak. At 2235, while attempting to isolate one of the condensers the Fort Calhoun Station reactor was manually tripped from approximately 30% power, because of a partial loss of vacuum in the main condenser. All safety systems functioned as designed and the plant proceeded into Mode 3 (Hot Shutdown).

The damaged condenser tube had been discovered during a previous maintenance shutdown conducted immediately prior to this event (March 15 - 25). The leak was not repaired prior to the plant startup following this shutdown due to a combination of problems. The personnel who were informed of the potentially leaking condenser tube did not fully investigate the concern, and, the applicable maintenance procedure does not provide clear direction for documenting identified tube leaks.

The condenser tube leak was plugged and the condenser tube will be reinspected during the next refueling outage to determine the cause of the failure. The procedure will be revised to address disposition of identified condenser tube leaks.

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TEXT *(if more space is required, use additional copies of NRC Form 366A)* (17)

BACKGROUND

The Fort Calhoun Station (FCS) uses a single tandem-compounded General Electric turbine generator with one high pressure turbine and two low pressure turbines. Each of the low pressure turbines exhausts to a separate condenser. The tube side of these condensers is cooled by (the ultimate heat sink) the Missouri River. Condenser vacuum is normally maintained at 30 inches of Mercury (Hg) vacuum. Each of the two condensers is independently monitored and alarmed for vacuum. The low vacuum alarms are set at 25 inches of Hg vacuum. The turbine trips at 19 inches of Hg vacuum.

EVENT DESCRIPTION

The plant had been shutdown for a maintenance outage from March 15 through March 25, 1996. Following the startup on March 25, 1996, a nominal 100% power was achieved on March 28, 1996. During the 10 day shutdown, both the "A" and "B" condensers had been removed from service to clean and inspect the condenser tubes. While the "A" condenser was being inspected, on March 16, 1996, maintenance personnel discovered a tube with a leak and identified a hole in the tube about one and one-half (1½) inches from the end of the tube. Maintenance personnel marked the tube and reported the tube leak to the System Engineer. The System Engineer was told that air was heard being drawn into the tube, and and that they had seen a hole in the condenser tube. Because of high noise in the area where the turnover occurred, the System Engineer did not hea' that a hole had been identified. Conditions in the condenser waterbox were reported by the maintenance personnel to be cool and wet, and that the leaking tube could be heard clearly from the east side of the condenser water box. The System Engineer questioned whether a tube leak could be identified under the existing plant conditions, because he believed that there was not a vacuum in the condenser to provide a pressure differential across the condenser tubes. At the time the maintenance personnel were investigating the leak there was a vacuum in the condenser. Cleaning was completed in "A" condenser and it was closed without repairing the leaking tube. The Preventive Maintenance Order (PMO) used by maintenance personnel for the cleaning of the condenser tubes does not clearly address identifying, documenting, and repairing leaking tubes. As part of the normal cleaning process, maintenance personnel identify tube leaks. Any leaks that may be identified are recorded on the condenser tube map and the System Engineer is notified.

Both condensers were returned to service after having been cleaned. No post maintenance leak check of the condenser tubes was required. During the intervening week between the plant's return to power operations and the trip on March 29, some evidence was noted of a leak in one of the condensers. The observed indication was sodium concentration spikes noted during routine chemistry samples of condensate and

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steam generators. The "A" condenser was suspected of being the one with the leaking tube as a result of this chemistry sampling. A decision was made by plant management to reduce power to below 50% over the weekend of March 29, in order to isolate the "A" condenser and repair any leaking tubes.

At 1615 on the afternoon of March 29, 1996, the plant began reducing power from 100%, to less than 50%, in order to allow the "A" condenser to be isolated. At approximately 2000, the Shift Supervisor was informed that sodium concentration in the secondary system was rising rapidly and that steam generator conductivity was also rising. The Shift Chemistry Technician took samples to verify results. The decision was made to shutdown the plant using Abnormal Operating Procedure (AOP) 05, "Emergency Shutdown," due to the increased sodium concentration and conductivity levels. Analysis of a sample in the "A" Steam Generator indicated 105 parts per billion (ppb) sodium present, which is greater than the administrative limit of 100 ppb. This level of sodium placed the plant in a chemistry action level II per Chemistry Procedure CH-AD-0003, "Plant Systems Chemical Limits and Corrective Actions." The action level II condition requires the plant to be below 60% power within four (4) hours of exceeding the action level and below 30% power within eight (8) hours of exceeding the action level. The power reduction was accelerated in order to ensure that power would be below 30% within the required eight (8) hours.

A Notification of Unusual Event (NOUE) was declared at 2048 by the Shift Supervisor, due to entry into Emergency Action Level (EAL) 11.6, "Increased Plant Staff Awareness." The Emergency Response Organization (ERO) was not activated. The Nuclear Regulatory Commission (NRC) Resident Inspector was notified of the plant's entry into the NOUE at 2058, and the NRC Operation Center was notified of the entry into the emergency classification at 2108, March 29, 1996, per 10 CFR 50.72(a)(i).

Steam generator sodium concentrations continued to increase, exceeding the chemistry action level III limits at 2220 in both steam generators. A chemistry action level III requires the plant to be below 5% power within four (4) hours of exceeding the limit.

In an attempt to isolate the source of the leak the "A" condenser was in the process of being isolated between 2205 and 2218. At 2216 the Control Room received the "A" condenser low vacuum alarm at 25 inches Hg vacuum. Six minutes later, at 2222, the Control Room received the "B" Condenser Low Pressure Alarm at 25 inches Hg vacuum.

With condenser vacuum continuing to lower, at 2234, the Control Room operators made the decision to manually trip the reactor, before the turbine automatically tripped, which would then have caused a reactor trip.

At 2235, the reactor was manually tripped from approximately 30% power. Emergency

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Operating Procedure (EOP) 00, "Standard Post Trip Actions," was entered. All plant systems responded normally. Both Emergency Diesel Generators started to idle speed, as designed.

The NOUE was terminated at 2312. The NRC Senior Resident, who was in the Control Room, was notified of the termination of the NOUE at 2312. The NRC Operations Center was notified that the NOUE had been terminated at 2312, and that the reactor had been manually tripped at 2235 from approximately 30% power, as required by 10 CFR 50.72(b)(2)(ii). This report is being submitted pursuant to 10 CFR 50.73(a)(2)(iv).

SAFETY SIGNIFICANCE

Major plant systems operated as designed during the reactor trip and subsequent recovery. A conservative decision was made by the operating crew to manually trip the reactor prior to a potential automatic turbine trip on low condenser vacuum. A turbine trip from greater than 15% power would have resulted in a reactor trip. Prompt conservative action by the operating crew ensured that there was minimal impact on steam generator chemistry.

CONCLUSIONS

The reactor was tripped in anticipation of a potential turbine trip due to a loss of condenser vacuum. The loss of the condenser vacuum was caused by the secondary plant response to the rapid shutdown, while attempting to isolate a leaking condenser tube. The cause of the condenser tube leak cannot be determined at this time. The condenser tube was plugged prior to the plant restart.

The condenser tube leak had been identified by maintenance personnel prior to the startup from the March 15, 1996, outage. The personnel who were informed of the potentially leaking condenser tube did not fully investigate the concern. The PMO that is used to clean and inspect the condenser tubes does not provide clear direction to maintenance personnel of the actions that they are to take when a condenser tube leak is discovered. In addition, the post maintenance testing that was directed by this procedure did not require a leak check of the tubes.

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CORRECTIVE ACTIONS

The condenser was isolated, the plant was shutdown, and the leaking condenser tube was plugged. The following additional corrective actions will be taken:

1. During the 1996 refueling outage, currently scheduled for September, 1996, the affected condenser tube will be inspected in an attempt to determine the cause of the damage to the tube.

2. PMO WP-006810 will be revised to clearly define what actions will be taken when a condenser tube leak is discovered, and who is responsible for taking those actions. This procedure will be revised prior to use, but, no later than September 1, 1996.

3. PMO WP-006810 will be revised to clearly identify needed post maintenance testing required after cleaning the condenser tubes. This procedure will be revised prior to use, but, no later than September 1, 1996.

PREVIOUS SIMILAR EVENTS

No similar events have occurred at the Fort Calhoun Station.