

Omaha Public Power District
444 South 16th Street Mall
Omaha, Nebraska 68102-2247
402/636-2000

November 7, 1994
LIC-94-0224

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 94-007 for the Fort Calhoun Station

Please find attached Licensee Event Report 94-007 dated November 7, 1994. This report is being submitted pursuant to 10 CFR 50.73(a)(2)(ii)(B) and 10 CFR 50.73(a)(2)(v)(B). If you should have any questions, please contact me.

Sincerely,

W. G. Gates

W. G. Gates
Vice President

WGG/jrg

Attachment

c: LeBoeuf, Lamb, Greene & MacRae
L. J. Callan, NRC Regional Administrator, Region IV
S. D. Bloom, NRC Project Manager
R. P. Mullikin, NRC Senior Resident Inspector
INPO Records Center

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NRC FORM 366 <small>(5-92)</small>		U.S. NUCLEAR REGULATORY COMMISSION			APPROVED BY OMB NO. 3150-0104 EXPIRES 5/31/95							
<h2 style="margin: 0;">LICENSEE EVENT REPORT (LER)</h2> <p style="margin: 5px 0 0 40px;">(See reverse for required number of digits/characters for each block)</p>								ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MN88 7714), 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				
FACILITY NAME (1) Fort Calhoun Station Unit No. 1					DOCKET NUMBER (2) 05000285			PAGE (3) 1 OF 5				
TITLE (4) Raw Water Pump Seal Water Supply Outside of Design Basis												
EVENT DATE (5)			LER NUMBER (6)			REPORT NUMBER (7)			OTHER FACILITIES INVOLVED (8)			
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER		
10	07	94	94	-- 007 --	00	11	07	94	FACILITY NAME	05000		
									FACILITY NAME	05000		
OPERATING MODE (9)		1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more) (11)									
POWER LEVEL (10)		100	20.402(b)			20.405(c)			50.73(a)(2)(iv)		73.71(b)	
			20.405(a)(1)(i)			50.36(c)(1)			X 50.73(a)(2)(v)		73.71(c)	
			20.405(a)(1)(ii)			50.36(c)(2)			50.73(a)(2)(vii)		OTHER	
			20.405(a)(1)(iii)			50.73(a)(2)(i)			50.73(a)(2)(viii)(A)		(Specify in Abstract below and in Text, NRC Form 366A)	
			20.405(a)(1)(iv)			X 50.73(a)(2)(ii)			50.73(a)(2)(viii)(B)			
			20.405(a)(1)(v)			50.73(a)(2)(iii)			50.73(a)(2)(x)			
LICENSEE CONTACT FOR THIS LER (12)												
NAME James R. Geschwender, Station Licensing Engineer								TELEPHONE NUMBER (Include Area Code) (402) 533-6857				
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)												
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS								
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)												
<p>The Potable Water (PW) storage tank provides the normal source of seal water for lubrication and cooling of Raw Water (RW) pump shaft bearings and packing. A backup source of seal water is available from the discharge of the RW pumps, and can be aligned to supply seal water via local manual valves. The RW pumps are classified as Critical Quality Element (CQE) equipment and the PW supply is classified as non-CQE equipment.</p> <p>On October 7, 1994, the results of an evaluation, regarding whether RW pump seal water supply piping performs a safety related function, were presented to the Fort Calhoun Station Plant Review Committee (PRC). Based on this presentation, the PRC concluded that a reportable condition existed involving reliance of the RW pumps on a non-CQE seal water supply.</p> <p>The root cause of this event was determined to be that the design process prior to initial plant start-up (in 1973) failed to adequately address the importance of seal water availability to RW pump operability.</p> <p>Corrective action was taken to make the backup seal water supply available without operator action. The seal water supply configuration to the RW pumps will be modified, prior to the 1995 Refueling Outage, to resolve this issue.</p>												

LICENSEE EVENT REPORT (LER) **TEXT CONTINUATION**

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Fort Calhoun Station Unit No. 1	05000285	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 OF 5
		94	-- 007 --	00	

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

BACKGROUND

The Fort Calhoun Station (FCS) Raw Water (RW) System is designed to provide cooling for the Component Cooling Water (CCW) System, which in turn provides cooling for various plant heat loads during normal and accident conditions. The RW System can also be used to provide direct cooling of certain engineered safeguards components in the event of a loss of CCW. Four RW pumps (AC-10A, AC-10B, AC-10C and AC-10D) are installed in the Intake Structure to provide screened river water to the CCW heat exchangers. The RW pump discharge piping is arranged as two interconnected headers, valved at the pumps and in the Auxiliary Building. Each header is designed to accommodate full flow to the CCW heat exchangers under all modes of plant operation.

Technical Specification (TS) 2.4 addresses operability requirements for raw water pumps. This TS allows one RW pump to be inoperable indefinitely without applying any Limiting Condition for Operation (LCO) action statement, if river water temperature is below 60 degrees Fahrenheit. When the river water temperature is greater than 60 degrees, an inoperable RW pump is to be restored to operability within seven days or the reactor is to be placed in hot shutdown.

During normal operation, one or two raw water pumps are ordinarily in operation, depending on the river temperature and the system loads. During winter months one pump is normally in operation, and during summer months two pumps may be in operation due to high river temperature or heavy loading of the CCW heat exchangers.

Each of the RW pumps is normally supplied with approximately 0.2 to 0.5 gallons per minute (gpm) of water for lubrication and cooling of pump shaft bearings and packing. This water normally comes from the Potable Water (PW) Storage Tank (PW-1) and is referred to as RW pump seal water. A "RAW WATER PUMPS SEAL WATER NO FLOW" annunciator is provided in the Control Room. A backup source of seal water is available from the discharge of each of the RW pumps, and can be aligned to supply seal water via local manual valves. The RW pumps are classified as Critical Quality Element (CQE) equipment and the PW supply is classified as non-CQE equipment.

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EVENT DESCRIPTION

On March 16, 1993, Engineering Assistance Request (EAR) 93-053 was initiated to evaluate whether normal and backup seal water supply piping performed a safety related function. The response to this EAR, dated April 27, 1993, concluded that seal water piping to the RW pumps was not required to be CQE. Further investigation of this issue was initiated on July 21, 1994, during preparations for an upcoming service water inspection. Arrangements were made for an independent pump consultant to provide an assessment of this issue. This assessment was then used to generate a revised response to the EAR, focusing on whether the operability of in-service RW pumps could be assured during the time from receipt of a seal water no flow alarm (assuming loss of the normal source of seal water) until a backup source of seal water could be manually aligned to the pumps.

Based on the independent pump consultant's report, Design Engineering Nuclear concluded that seal water performs a safety-related function in supporting the operability of the RW pumps. It was also concluded that operator actions in response to a seal water no flow alarm could not assure that operability of RW pumps would be maintained if the normal source of seal water were to be completely lost.

These conclusions were presented to the FCS Plant Review Committee (PRC) on October 7, 1994. An operability evaluation was also presented that provided a justification for considering the RW pumps to be operable in the existing configuration. Based on this presentation, on October 7, 1994, at 1029 (with FCS in Mode 1 at approximately 100% power), the PRC determined that reliance of the RW pumps on a non-CQE seal water supply was reportable pursuant to 10 CFR 50.72(b)(1)(ii)(B) and 10 CFR 50.72(b)(2)(iii)(B). The NRC was notified of this determination at 1125 on October 7, 1994.

Safety Analysis for Operability (SAO) 94-01 was approved October 13, 1994, providing additional documentation regarding the safety impact of this issue and the basis for the determination that the RW system was operable. This LER is being submitted pursuant to 10 CFR 50.73(a)(2)(ii)(B) and 10 CFR 50.73(a)(2)(v)(B).

SAFETY ASSESSMENT

As documented in SAO 94-01, the RW system was determined to be operable. The safety analysis supporting this determination was based on assessment of scenarios that might result in loss of the PW supply to the RW pumps.

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In summary, a complete and sudden loss of the PW supply of seal water to the RW pumps (i.e., a full pipe break) is not considered to be a credible random pipe failure due to the moderate energy classification of the PW system. A "critical crack" is considered credible, and could result in a leak rate of approximately 41 gpm. Combined with a conservative estimate of PW usage rate and unavailability of makeup water to the PW tank, it was estimated that there would be approximately 45 minutes between receipt of a PW tank low level alarm and the depletion of the PW supply. This was considered sufficient time to allow operators to restore makeup to the tank, provide an alternate water source to the RW pumps, or isolate the leak.

Although a full pipe break is not considered a credible random failure, certain events were identified that could potentially sever a PW pipe and cause a sudden and complete loss of the PW supply of seal water. These events are: a break in the steam supply line to the steam driven auxiliary feedwater pump (FW-10), a steam or feedwater line break in the turbine building, or a design basis earthquake. For these events, it is conservatively assumed that the loss of seal water would disable all RW pumps. However, RW system operation following these events is not essential to maintain the plant in hot shutdown.

A probabilistic risk based assessment was performed to evaluate the effect on core damage frequency of considering RW pump operability to be dependent on PW. This assessment, which was reviewed by the Probabilistic Risk Assessment (PRA) Oversight Committee, was performed using a detailed fault tree model. The evaluation of this condition indicated that the increase in overall core damage frequency was not significant.

CONCLUSIONS

An investigation determined that the RW pump seal water configuration originally approved for fabrication during plant construction, showed seal water as being supplied from the RW pump discharge nozzle (i.e., filtered river water). A design change request was initiated in 1971, proposing the use of service water or potable water as the water source, due to concerns regarding filter clogging with the use of filtered river water. Prior to initial plant operation in 1973, a design change was implemented to provide PW to the RW pumps as the primary source of seal water. No original design documentation was located specifying that seal water performs a safety-related function for the RW pumps. As a result, it has been concluded that the root cause of this problem was that the design process prior to initial plant start-up (in 1973) failed to adequately address the importance of seal water availability to RW pump operability.

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CORRECTIVE ACTIONS

The following corrective actions have been or will be completed:

1. The backup RW pump seal water supply piping from the discharge of each RW pump was removed, inspected and confirmed to be capable of passing sufficient seal water flow. This action was completed on October 7, 1994.
2. Operating Instruction OI-RW-1 was revised on October 7, 1994 to align the backup seal water supply so that it is available to the RW pumps without operator action. (This is an interim action pending completion of Corrective Action 4.)
3. Training will be provided to operators to emphasize the importance of seal water availability to RW pump operability. This action will be completed by December 1, 1994.
4. The seal water supply configuration to the RW pumps will be modified prior to the 1995 Refueling Outage to resolve this issue.
5. A review will be performed on CQE pumps to ensure that the operability of these pumps does not depend on a non-CQE mechanical support system or components. This review will be completed prior to the 1995 Refueling Outage.

PREVIOUS SIMILAR EVENTS

LERs 90-025 and 89-017 discuss previous events involving raw water system design basis issues.