

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Fort Calhoun Station, Unit No. 1 DOCKET NUMBER (2) 01510101012851 PAGE (3) 1 OF 04

TITLE (4) Pneumatic Operated Valves Outside Design Basis During Design Basis Accident

EVENT DATE (5) MONTH: 04 DAY: 06 YEAR: 88 LER NUMBER (6) SEQUENTIAL NUMBER: 009 REVISION NUMBER: 000 REPORT DATE (7) MONTH: 05 DAY: 06 YEAR: 88 OTHER FACILITIES INVOLVED (8) FACILITY NAME(S): N DOCKET NUMBER(S): 0151010101

OPERATING MODE (9) 1 THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 50.72(b)(1)(ii)(B) (Check one or more of the following) (11)

20.402(b)	20.404(a)	20.73(a)(2)(vi)	73.71(a)
20.405(a)(1)(B)	20.406(a)(1)	20.73(a)(2)(vii)	73.71(a)
20.406(a)(1)(B)	20.406(a)(2)	20.73(a)(2)(viii)	OTHER (Specify in Abstract below and in Part 4 of NRC Form 308A)
20.406(a)(1)(B)	20.73(a)(2)(i)	20.73(a)(2)(viii)(A)	
20.406(a)(1)(v)	XX 20.73(a)(2)(i)	20.73(a)(2)(viii)(B)	
20.406(a)(1)(v)	20.73(a)(2)(ii)	20.73(a)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12) NAME: Mike Schlosser, Shift Technical Advisor TELEPHONE NUMBER: AREA CODE: 402426-4011

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

CAUSE	SYSTEM	COMPONENT	MANUFAC. TYPED	REPORTABLE TO NRC	CAUSE	SYSTEM	COMPONENT	MANUFAC. TYPED	REPORTABLE TO NRC

SUPPLEMENTAL REPORT EXPECTED (14) YES (if you complete EXPECTED SUBMISSION DATE) [XX] NO EXPECTED SUBMISSION DATE (15) MONTH: DAY: YEAR:

ABSTRACT (Limit to 1400 spaces, i.e., approximately 17000 single-space typewritten spaces) (16)

On April 6, 1988 at 1425 (CDT), the Omaha Public Power District concluded an investigation, as part of a self-conducted SSFI, which identified concerns about the capability of certain valves to perform their design function during a design basis accident with a concurrent loss of instrument air. The valves of concern are LCV-383-1&2, Safety Injection and Refueling Water Tank (SIWRT) isolation valves; HCV-238 & HCV-239 charging pump header to Reactor Coolant System (RCS) isolation valves; and HCV-240 auxiliary pressurizer spray isolation valve; and HCV-438 B & D, isolation valves for Component Cooling Water (CCW) to Reactor Coolant Pump (RCP) seal coolers. NRC Resident Inspectors were notified of the concerns and a one hour report to the NRC under 10 CFR 50.72(b)(1)(ii)(B) was made at 1523 on April 6, 1988.

Further efforts concerned identifying alternate methods of performing the functions that are affected by these valves or supplementing their motive force (instrument air) to maintain operability.

LE22  
1/1

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)  Fort Calhoun Station, Unit No. 1	DOCKET NUMBER (2)  0 1 5 0 0 0 2 8 5	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		8 8	0 0 9	0 0	0 2	OF 0 4

TEXT (if more space is required, use additional NRC Form 308A)

On April 6, 1988 at 1425 (CDT), as part of a self-conducted Safety System Functional Inspection (SSFI), the Omaha Public Power District concluded an investigation, documented in Operations Support Analysis Report (87-10), of valve operators that have installed accumulators. This report questions the capability of certain valves to perform their design function during a design basis accident with a concurrent loss of instrument air. The valves of concern are LCV-383-1&2, Safety Injection and Refueling Water Tank (SIRWT) isolation valves; HCV-438B & D, Component Cooling Water (CCW) to Reactor Coolant Pump (RCP) seal cooler isolation valves; HCV-238 & 239, charging pump header to Reactor Coolant System (RCS) isolation valves; and HCV-240 auxiliary pressurizer spray isolation valves. NRC Resident Inspectors were notified of the concerns and a one hour report to the NRC under 10CFR 50.72(b)(1)(ii)(B) was made at 1523 on April 6, 1988.

Valves LCV-383-1&2 are the SIRWT header isolation valves. They are air to close, spring to open, fail open valves. They receive a Recirculation Actuation Signal (RAS) to close with Safety Injection Actuation Signal (SIAS) in conjunction with low level in the SIRWT. The RAS realigns Safety Injection SI pump suction to the containment sump. The OSAR indicates that these valves must remain closed for 1000 hours following a Loss of Coolant Accident (LOCA). It is the engineering judgment of OPPD that the accumulator would not hold the valves shut for this period of time. Thus, it appears that the valves as installed may be outside the design basis.

If LCV-383-1 or LCV-383-2 were to fail open, analyses performed by our engineering personnel have confirmed that adequate net positive suction head (NPSH) would remain available for proper Safety Injection (SI) pump operation. The worst case consequence would be back flow of high activity coolant from the containment sump into the SIRWT which vents to the Auxiliary Building. LCV-383-1&2 are in series with check valves, SI-140 and SI-139 respectively, that must also fail to create a situation where the reactor coolant would backfeed into the SIRWT.

Immediate corrective action was taken to provide a backup motive force to these valves. Nitrogen, which is accessible post-LOCA, has been provided as a longer term backup to the accumulator. This change is documented in the temporary jumper log and AOP-17, Loss of Instrument Air, has been revised to require an operator to check the availability of nitrogen and change bottles as appropriate during a loss of instrument air event. The availability of the nitrogen backup to the accumulator ensures the operability of these valves to perform their long term design function. An Engineering Evaluation Assistance Request (EEAR) has been initiated to provide for a permanent solution. The valves are currently considered operable. The permanent solution will be in place prior to start up following the 1988 refueling outage.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1):  Fort Calhoun Station, Unit No. 1	DOCKET NUMBER (2):  0 15 10 10 10 2 8 5 8 8 - 0 0 9 - 0 0 0 3 OF 0 4	LER NUMBER (3):			PAGE (3):	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		

TEXT (if more space is required, use additional NRC Form 266A 2/117)

Valves HCV-238 (closed), 239 (closed), and 240 (open) of the Chemical and Volume Control System (CVCS) valves that provide a path for hot leg injection following a LOCA. Hot leg injection is only required for large breaks on the cold leg side of the Reactor Coolant System (RCS) that divert flow from the core. The valves HCV-238 and 239 are air to close, spring to open and fail open on loss of air or power; HCV-240 is air to open, spring to close and fails closed. The OSAR analysis indicates that the accumulator must be functional indefinitely to position HCV-238; HCV-239, and HCV-240 for hot leg injection.

It is the engineering judgment of OPPD that the accumulator would not hold the valves in the hot leg injection positions indefinitely. Redundant solenoid operated valves are available to ensure that hot leg injection can be achieved with a single failure of any of the three air operated valves. However, assuming HCV-238, 239 and 240 cannot meet their design function, it appears that hot leg injection following a LOCA may not meet single failure criteria.

In addition to the path for hot leg injection through HCV-240, an alternate path is available through SI-186, HCV-347, and HCV-348. Currently this path is defeated because SI-186 is a locked closed, manually operated valve located in a room that would be inaccessible post-RAS. Therefore, an Operations Memorandum has been issued providing instruction to open SI-186 prior to RAS. A modification request has been initiated to ensure that an alternate path for simultaneous hot leg injection is available for the long term. This modification will be completed prior to start up following the 1988 refueling outage.

Valves HCV-438B/D are the outside containment isolation valves for CCW to the RCP seal cooling. The original design was to close on Containment Isolation Actuation Signal (CIAS). The valves were normally open, spring to close. The preferred failure mode was changed several years ago to provide for Operations to use RCP's under various conditions. As modified they are normally open valves and receive a close signal with CIAS in conjunction with low pressure in the CCW line. The valves are air to close, spring to open, fail open. An accumulator is installed to provide motive force for closing the valves with loss of instrument air. The OSAR indicates that the accumulator should be designed to hold the valves closed for 1000 hours. The valves have been tested and proven to hold for at least 30 minutes. It would appear that the valves as installed are outside their design basis as defined in the Updated Safety Analysis Report (USAR).

Within the original criteria for the design basis LOCA, the assumption of a pipe break inside containment, in addition to the LOCA was not required. The LOCA analysis assumptions required consideration of single active failures but not passive failures. The current closure signal (Containment Isolation

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)  Fort Calhoun Station, Unit No. 1	DOCKET NUMBER (2)  0 5 0 0 0 2 8 5 8 8	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		0 0 9	0 0 0	0 0 0	4	0 4

TEXT (if more space is required, use additional NRC Form 255A (2) (1))

Actuation Signal in conjunction with a Component Cooling Water Low Pressure signal), which closes HCV-438B and HCV-438D is an additional conservatism in our design that is not required within the intent of the Accident Analysis criteria under which Fort Calhoun is licensed. However, HCV-438B/D may be outside the design basis as stated in USAR section 5.9.5 because they have not been tested for 1000 hours. Therefore, an engineering assessment will be initiated to fully address the validity of the basis as stated in the USAR. Pending the outcome of the analysis the valves are considered capable of performing their design function. The valves are addressed in this LER because they were mentioned in the one hour report.

The results of the various engineering assessments identified in this LER will be provided in a supplemental report.

**Omaha Public Power District**  
1623 Harney Omaha, Nebraska 68102-2247  
402/536-4000

May 6, 1988  
LIC-88-276

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

Reference: Docket No. 50-285

Gentlemen:

SUBJECT: Licensee Event Report for the Fort Calhoun Station

Please find attached Licensee Event Report 88-009 dated May 6, 1988. This report is being submitted per requirements of 10 CFR 50.73.

Sincerely,

*R. L. Andrews*

R. L. Andrews  
Division Manager  
Nuclear Production

RLA/me

Attachment

c: R. D. Martin, NRC Regional Administrator  
A. Bournia, NRC Project Manager  
P. H. Harrell, NRC Senior Resident Inspector  
INPO Records Center  
American Nuclear Insurers

JER2  
1/1