

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

June 2, 1989  
LIC-89-536

U. S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
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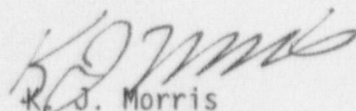
Reference: Docket No. 50-285

Gentlemen:

Subject: Licensee Event Report 89-012 for the Fort Calhoun Station

Please find attached Licensee Event Report 89-012 dated June 1, 1989.  
This report is being submitted per requirements of 10 CFR  
50.73(a)(2)(ii)(B).

Sincerely,

  
K. J. Morris  
Division Manager  
Nuclear Operations

KJM/tcm

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

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## LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Fort Calhoun Station Unit No 1										DOCKET NUMBER (2) 0 5 0 0 0 2 8 5										PAGE (3) 1 OF 0 5			
TITLE (4) Feedwater Valve HCV-1386 Inoperable Due To Maintenance Program Deficiency																							
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 NAMES N					DOCKET NUMBER(S) 0 5 0 0 0									
0	5	0	2	8	9	8	9	0	1	2	0	0	0	6	0	1	8	9	0	5	0	0	0
OPERATING MODE (9) 1		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more of the following) (11)																					
POWER LEVEL (10) 0 1 0		20.402(b)				20.406(e)				50.73(a)(2)(iv)				73.71(b)									
		20.406(a)(1)(i)				50.36(a)(1)				50.73(a)(2)(v)				73.71(c)									
		20.406(a)(1)(ii)				50.36(a)(2)				50.73(a)(2)(vi)				OTHER (Specify in Abstract below and in Text, NRC Form 365A)									
		20.406(a)(1)(iii)				50.73(a)(2)(ii)				50.73(a)(2)(viii)(A)													
		20.406(a)(1)(iv)				50.73(a)(2)(ii)				50.73(a)(2)(viii)(B)													
		20.406(a)(1)(v)				50.73(a)(2)(iii)				50.73(a)(2)(ix)													
LICENSEE CONTACT FOR THIS LER (12)																							
NAME Mark Hollingsed, Shift Technical Advisor										TELEPHONE NUMBER 4 1 0 1 2 4 1 2 6 1 - 1 4 1 0 1 1 1													
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																							
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC													
SUPPLEMENTAL REPORT EXPECTED (14)										EXPECTED SUBMISSION DATE (15)		MONTH		DAY		YEAR							
<input checked="" type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE)										NO		0 1 9		2 1 9		8 1 9							

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

At 1610 hours on May 2, 1989, plant management of Fort Calhoun Station determined that the main feedwater isolation valve to the "A" steam generator was inoperable due to an improperly set torque switch on the valve's motor operator. The valve would not have closed completely before being tripped by the switch during certain accident conditions, and was therefore outside the design basis of the plant. At the time of the determination, the plant was operating at 10% power and preparing to go back on-line following a 3 day outage. In accordance with 10 CFR 50.72(b)(1)(ii)(B), the NRC Operations Center was notified at 1625 hours on the same day. This LER is subsequently submitted pursuant to 10 CFR 50.73(a)(2)(ii)(B).

The cause of this event is an inadequate program for maintenance of Motor Operated Valves. The torque switches on this valve and on three identical valve operators have been reset to ensure adequate closing thrust is available. An extensively improved motor-operated valve maintenance program plan is currently being developed, and is expected to be approved by August 31, 1989.

## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

APPROVED OMB NO. 3150-0104

EXPIRES 8/31/88

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Fort Calhoun Station Unit No. 1	0 5 0 0 0 2 8 5 8 9	--	0 1 2	--	0 1 0	0 2	OF 0 5

TEXT (If more space is required, use additional NRC Form 366A's) (17)

At 1610 hours on May 2, 1989, plant management of Fort Calhoun Station determined that HCV-1386, the main feedwater isolation valve to the "A" steam generator, was inoperable. The valve was inoperable because of an improperly set torque switch on the valve's motor operator. The valve receives a signal to close from the Steam Generator Isolation Signal (SGIS) during a main steam line break inside or outside containment to minimize the resultant overcooling of the reactor coolant system due to the excessive heat extraction. With the improper torque switch setting, it was determined that the valve could not be closed completely during a main steam line break, a condition outside the design basis of the plant. The plant was at approximately 10% power when inoperability of HCV-1386 was determined.

In accordance with 10 CFR 50.72(b)(1)(ii)(B), the NRC Operations Center was notified at 1625 hours on the same day. This LER is subsequently submitted pursuant to 10 CFR 50.73(a)(2)(ii)(B).

Investigation into the torque switch settings had been initiated after it had been discovered on May 1, 1989, that two non-safety related main feedwater isolation valves, HCV-1103 and HCV-1104, could not be closed from the control room. The plant was preparing to increase power and re-synchronize the generator to the grid following a 3 day outage to test the performance of the turbine overspeed trip. An initial condition of the start-up procedure in use was that HCV-1103 and HCV-1104 be closed. At that point, it was discovered that the valves could be opened, but not closed, from the control room. The investigation of the failure of these valves to close determined that the torque switches on the valve motor operators had been set at 1, which corresponds to a stem thrust ranging from approximately 18,000 pounds for a non-lubricated valve stem to 21,600 pounds for a well-lubricated stem. The minimum stem thrust required for a 1500 psi differential across the valves is 47,700 pounds. The torque switches on HCV-1103 and HCV-1104 were reset to 2.75, which corresponds to a stem thrust ranging from approximately 55,700 to 66,800 pounds (non-lubricated to well-lubricated stem).

It was then decided to check the torque switch settings on HCV-1386 and HCV-1385, since these are identical type valves to HCV-1103 and HCV-1104, and are the primary feedwater isolation valves for the SGIS. HCV-1386 is the isolation valve downstream of HCV-1103 on the main feedwater header to the "A" steam generator, and HCV-1385 is the isolation valve downstream of HCV-1104 on the main feedwater header to the "B" steam generator. The minimum required stem thrust on these valves is also 47,700 pounds. The torque switch on HCV-1386 was found set at 1.75,



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APPROVED OMB NO 3150-0104  
EXPIRES: 8/31/91

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TEXT (If more space is required, use additional NRC Form 366A's) (17)

which corresponds to a stem thrust of approximately 34,200 to 41,000 pounds (non-lubricated to well-lubricated). The torque switch on HCV-1385 was found set at 2.5, corresponding to a stem thrust of approximately 50,300 to 60,300 pounds (non-lubricated to well-lubricated), which was acceptable. The torque switches on both valves were then reset to 2.75 to ensure adequate closing thrust, as on HCV-1103 and HCV-1104.

All four valves (HCV-1103, 1104, 1385, and 1386) involved receive signals to close from the SGIS; however, HCV-1385 was considered able to perform its design function since its torque switches were set high enough (i.e., 2.5) to close the valve under the design basis differential pressure.

Following these discoveries, a review was performed of maintenance records of all other safety-related valves with motor operators in the plant. The results of this review indicated that each torque switch was correctly set to provide the required stem thrust.

On the following day, May 3, 1989, vendor equipment was connected to measure the actual stem thrust on the affected valves, and the torque switches were reset as shown:

	<u>Torque switch setting</u>	<u>Measured Thrust at Torque Switch Trip</u>
HCV-1103	2.5	77,808 pounds (lubricated stem)
HCV-1104	2.5	70,434 pounds (lubricated stem)
HCV-1385	2.5	64,232 pounds (lubricated stem)
HCV-1386	2.75	76,568 pounds (lubricated stem)

The relationship between torque switch setting and stem thrust is dependent on variables such as spring pack condition, packing tightness, and stem lubrication. Stem thrust is the critical parameter of the two; therefore, torque switches are set after the desired stem thrust is verified by measurement. Normally when measuring the stem thrust, a load cell is attached to the top of the operator. This method of measurement requires that the operator have an upper thrust bearing to support the loads imposed by the testing. The Limitorque SMB 4T operators, used on the valves noted previously, do not have the required upper thrust bearing. Therefore, the stem thrust could not be measured on these valves in past testing using available test equipment, and the torque switches could not be reliably set as part of routine valve maintenance.

## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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EXPIRES 8/31/88

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TEXT (If more space is required, use additional NRC Form 385A's) (17)

Recently, testing equipment became available which measures stem thrust using a strain gage attached to the stem, and does not require the operator to have an upper thrust bearing. This equipment was used on May 3, 1989, when the torque switches were reset to their present settings.

A review of maintenance records related to torque switch settings has been conducted and the results of this are being evaluated. The evaluation results will be provided to the NRC in a supplement to this LER.

The cause of the incorrect torque switch settings is lack of an adequate MOV maintenance program, particularly the inability to measure stem thrust and properly set torque switches for SMB-4T operators. Because these operators can deliver enough torque to damage valves if improperly adjusted, maintenance emphasis in the past was on valve protection rather than insuring capabilities of valves to perform their intended function. In this case, this emphasis probably resulted in low torque switch settings. These settings were therefore not adequately controlled by the existing maintenance procedures.

An extensive MOV improvement plan proposal has been issued for management review and approval. The plan is designed to develop a data base of all MOV's, create training programs for engineering and craft personnel, perform baseline testing of all MOV's, procure necessary spare parts, and initiate preventive and predictive maintenance of all MOV's. This new program will provide assurance that all plant MOV's are properly tested, maintained, and adjusted, thereby assuring the operability of the valves. It is expected that the program will be approved by August 31, 1989. Implementation will be defined in the program plan.

There are only 5 safety-related motor operated valves in the plant for which stem thrust had not been measured: HCV-1385 and HCV-1386, HCV-383-3 and HCV-383-4 (Containment Sump Isolation Valves), and HCV-308 (Charging Pump Discharge to HPSI Isolation Valve). HCV-383-3 and HCV-383-4 are closed during normal operations, and are opened only in the emergency condition of a loss of coolant accident, with a low level in the Safety Injection Refueling Water Tank, to supply the safety injection and containment spray pumps with water from the containment sump. These butterfly valves are currently tested under the station Inservice Inspection Test Program. Any differential pressure across these valves during a design basis event will aid in the opening of the valves.

## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

EXPIRES: 8/31/00

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TEXT (If more space is required, use additional NRC Form 366A's) (17)

Motor operated valve HCV-308 has a non-locking operator gear set. As a result, it currently cannot be tested. Modification package MR-FC-86-91 is being generated to eliminate this problem. This package is scheduled for completion during the 1990 refueling outage. In addition, an air operated valve provides an alternate flow path.

Valves HCV-1103 and HCV-1104 are redundant valves upstream of valves HCV-1386 and HCV-1385, respectively. These valves receive a Steam Generator Isolation Signal (SGIS), but are not taken credit for in the accident analysis and are not considered safety grade. The safety function of HCV-1386 is to isolate main feedwater flow to steam generator RC-2A upon receipt of a SGIS. SGIS is designed to minimize the cooldown of the reactor coolant system in the event of a main steam line break. It is assumed in the Updated Safety Analysis Report (USAR) that feedwater isolates within 30 seconds after SGIS is actuated. Therefore, in the event of a steam line break, feedwater to steam generator RC-2A may not have isolated (prior to resetting of the torque switches) in the assumed time with HCV-1386 inoperable. No valid SGIS was initiated during the time period that HCV-1386 was inoperable.

Although reports of inability to remotely operate valves have been submitted in the past, this is the first reported case of inability to close a valve due to improperly set torque switches.