

UPDATED REPORT - PREVIOUS REPORT DATE MARCH 6, 1984  
**LICENSEE EVENT REPORT (LER)**

FACILITY NAME (1) Browns Ferry - Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 2 5 9	PAGE (3) 1 OF 0 3
--	--------------------------------------	----------------------

TITLE (4)  
 Shutdown Cooling System Not Available Due to Valve Failure to Open

EVENT DATE (6)			LER NUMBER (8)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)		
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES		DOCKET NUMBER(S)
0 2	1 4	8 4	8 4	0 1 2	0 1	0 8	2 8	8 4			0 5 0 0 0
											0 5 0 0 0

OPERATING MODE (9) N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following) (11)									
POWER LEVEL (10) 0 0 0	20.402(b)	20.406(c)	80.73(e)(2)(iv)	73.71(b)						
	20.406(a)(1)(i)	80.38(a)(1)	80.73(e)(2)(v)	73.71(c)						
	20.406(a)(1)(ii)	80.38(a)(2)	80.73(e)(2)(vii)	X OTHER (Specify in Abstract below and in Text, NRC Form 366A) Voluntary Report						
	20.406(a)(1)(iii)	80.73(a)(2)(i)	80.73(e)(2)(viii)(A)							
	20.406(a)(1)(iv)	80.73(a)(2)(ii)	80.73(e)(2)(viii)(B)							
	20.406(a)(1)(v)	80.73(a)(2)(iii)	80.73(e)(2)(x)							

LICENSEE CONTACT FOR THIS LER (12)

NAME J. B. Walker	TELEPHONE NUMBER
	AREA CODE: 2 1 0 5   7 1 2 9   - 1 0 8 6 5

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
X	BIO	MQ	R16	B					

SUPPLEMENTAL REPORT EXPECTED (14)

<input checked="" type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE)	<input type="checkbox"/> NO	EXPECTED SUBMISSION DATE (15)
		MONTH: 0 2   DAY: 1 5   YEAR: 8 5

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

On February 14, 1984, while bringing units 1 and 2 to cold shutdown [because of the residual heat removal service water system air release valves not being properly certified for the design pressure (Reference BFRO-50-259/84013)], residual heat removal (RHR) valve FCV-1-74-48 on unit 1 failed to open, making it impossible to achieve cold shutdown using normal methods. An ALERT was declared per the Radiological Emergency Plan. The plant was brought to cold shutdown through alternate means and the ALERT was cancelled after the valve was opened manually and shutdown cooling restored.

An investigation of this event revealed that the "B" phase winding of the motor on valve FCV-74-48 failed. At this time it is not known if the failure of valve FCV-74-48 to open was a result of the failure of "B" phase motor winding or if the motor failed as a result of other causes.

8409100046 840828  
 PDR ADDOCK 05000259  
 S PDR

## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)  Browns Ferry - Unit 1	DOCKET NUMBER (2)  0 5 0 0 0 2 5 9 8 4 - 0 1 2 - 0 1 0 2 OF 0 3	LER NUMBER (8)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		

TEXT: If more space is required, use additional NRC Form 365A's (17)

On February 14, 1984, with units 1 and 2 operating at 99 percent power and unit 3 in a refueling outage, the decision was made to bring units 1 and 2 to cold shutdown due to the air release valves (V) on the residual heat removal service water/emergency equipment cooling water system (BI) not being properly certified for the design pressure. (Reference LER BFRO-50-259/84013.)

After manually scrambling units 1 and 2, unit 1 could not be placed in shutdown cooling using the Residual Heat Removal System (BO) due to the inability to open electrically shutdown cooling suction valve (ISV) FCV-1-74-48. This valve is located inside primary containment (NH) which was inerted at the time of the event and not readily accessible for manual operation. An ALERT was declared per the Radiological Emergency Plan at 0800 on February 14, 1984, because of the inability to use shutdown cooling. Staffing of emergency centers was begun immediately. NRC was notified by red phone of the ALERT at 0830. The ALERT remained in effect and communications with NRC maintained until 1725 on February 14, 1984 when the ALERT was cancelled. This event was not escalated higher than an ALERT. After drywell entry was made (approximately 1312), the valve manually opened (approximately 1550) and shutdown cooling established (approximately 1715) using residual heat removal system, Loop I, the ALERT was cancelled. However, cold shutdown was previously achieved through normal cooldown to the condenser (SG) and then using control rod drive system (AA) pumps and the reactor water cleanup system (CE) as an alternate method for residual heat removal. Emergency core cooling systems [low pressure coolant injection (BO) and core spray (BM)] were available throughout the event. In addition, the condensate system (SD) was also available if needed for reactor vessel (RPV) makeup, and both high pressure coolant injection (BJ) and reactor core isolation cooling (BN) could have been made available by using auxiliary steam if required. The pressure suppression chamber was available for heat rejection if it had been required. Because of these multiple systems, at no time were there any serious safety implications of this event.

| Valve FCV 74-48 is a 20-inch Walworth-Gate valve with a Limitorque operator and a Reliance Electric Company motor.

An investigation of this event revealed that the "B" phase winding of the motor on valve FCV 74-48 failed. At this time it is not known if the failure of valve FCV 74-48 to open was a result of the failure of "B" phase motor winding or if the motor failed as a result of other causes.

| The investigation revealed that the "close" torque switch for FCV-74-48 was set at 2.5. This torque switch setting is higher than recommended by the manufacturer. Limitorque recommends a maximum torque switch setting of 2.0 for FCV-74-48. A Limitorque Corporation factory representative stated that a "close" torque switch setting of 2.5 could cause damage to the valve operator, motor, and/or cause the valve seat to stick closed due to overtightening.

| A series of tests have been conducted under various reactor operating conditions in order to obtain specific data about the operating characteristics of FCV-74-48. These tests entailed the use of a multichannel recording oscillograph to obtain voltage and current recordings as FCV-74-48 is operated. The results of these tests are summarized as follows:

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)  Browns Ferry - Unit 1	DOCKET NUMBER (2)  0 5 0 0 0 2 5 9 8 4	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
		0	12	01	03	OF	03

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

1. After the reactor has been in operation, there is substantially greater torque required to initially "break loose" the valve when opening and going into shutdown cooling mode as compared to subsequent cycling of the valve. (Compare graph 1 to graph 2.)
2. After the "close" torque switch was readjusted to within the range specified by Limitorque, there was a substantial reduction in the torque required to initially "break loose" the valve upon opening and going into shutdown cooling mode. (Compare graph 1 to graph 3.)

Electrical Maintenance Instruction 18 is being revised to improve recording and review of acceptance criteria and data recording of torque switch settings. A modification is under evaluation to install torque limiter plates on the torque switch to prevent a setting higher than the maximum recommended value. (Limitorque has installed these limiting plates on all torque switches made since 1974.) The failed motor has been returned to the Reliance Electric Motor factory for an additional failure analysis. The results should be available by February 15, 1985.

Responsible Plant Section N/A

Previous Similar Events - None

488 Volts AC.

Voltage

# GRAPH #1

Low Range Current

High Range Current

43 AMP  
peak motor  
current  
required to  
"break-loose"  
the wedge from  
the valve seat.

$A\phi$  Current: High, low + voltage

First Opening Stroke <sup>chart speed</sup> 4"/sec. (.1 sec. timing lines)  
FCV 74-48 6-20-84 @ ≈ 11:05 AM close torque switch set @ 2.5

488V

Voltage

# GRAPH #2

7 AMP RANGE

Low Range Current

18.8  
Amp  
Peak

70 AMP RANGE

High Range Current

2nd Valve opening Stroke

FCV 74-48

6-20-84 @ 11:08 AM

close torque switch set @ 2.5

4" / sec with .1 sec timing lines.

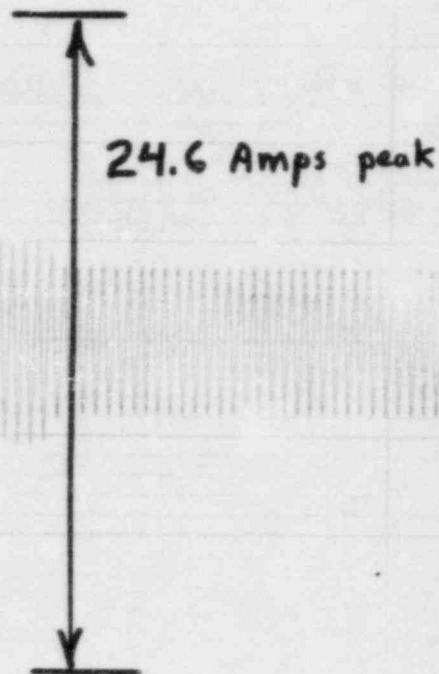
Copy #3

RHR Suction Isolation valve FCV 74-48 8-21-84  
Opening Current & Voltage  
Voltage

### GRAPH #3

High Range Current

Low Range Current



Unit 1 FCV 74-48 8/21/84  
First Opening Stroke going into Shutdown Cooling  
Close Torque Switch set @ 1.9

TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401

Browns Ferry Nuclear Plant

P. O. Box 2000

Decatur, Alabama 35602

August 28, 1984

U. S. Nuclear Regulatory Commission  
Document Control Desk  
Washington, D. C. 20555

Dear Sir:

TENNESSEE VALLEY AUTHORITY - BROWNS FERRY NUCLEAR PLANT UNIT 1 - DOCKET  
NO. 50-259 - FACILITY OPERATING LICENSE DPR-33 - REPORTABLE OCCURRENCE  
REPORT BFRO-50-259/84012 R1

The enclosed updated report provides additional information that concerns  
the unavailability of shutdown cooling system due to valve (FCV-1-74-48)  
failure to open. This report was originally submitted as a voluntary  
report.

Very truly yours,

TENNESSEE VALLEY AUTHORITY



G. T. Jones  
Plant Manager  
Browns Ferry Nuclear Plant

Enclosure

cc (Enclosure):  
Regional Administrator  
U. S. Nuclear Regulatory Commission  
Office of Inspection and Enforcement  
Region II  
101 Marietta Street, Suite 2900  
Atlanta, Georgia 30303

INPO Records Center  
Suite 1500  
1100 Circle 75 Parkway  
Atlanta, Georgia 30339

NRC Resident Inspector, BFN

IEZZ  
1/1