

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

TITLE (4)

Shutdown Cooling System Not Available Due to Valve Failure to Open

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					DOCKET NUMBER(S)															
0	2	1	4	8	4	8	4	-	0	1	2	-	0	2	0	2	1	5	8	5	0	5	0	0	0				

OPERATING MODE (B)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following) (11)									
POWER LEVEL (10)		N	20.402(b)	20.406(c)	50.73(a)(2)(iv)	73.71(b)					
0 0 0			20.406(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)					
			20.406(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	X OTHER (Specify in Abstract below and in Text, NRC Form 365A)					
			20.406(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	Voluntary Report					
			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	TELEPHONE NUMBER				
J. B. Walker	<table border="1"> <tr> <td>AREA CODE</td> <td></td> </tr> <tr> <td>205</td> <td>729 1-25 1316</td> </tr> </table>	AREA CODE		205	729 1-25 1316
AREA CODE					
205	729 1-25 1316				

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)											
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPROS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPROS	
X	B	O M O	R 1 6 5	N							

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE)	<input checked="" type="checkbox"/> NO				

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. Apparently, the gate stuck in the valve seat and the motor could not generate enough torque to open the valve.

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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

APPROVED OMB NO. 3150-0104

EXPIRES: 8/31/85

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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 was 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. Apparently, the gate stuck in the valve seat and the motor could not generate enough torque to open the valve.

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 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

APPROVED OMB NO. 3150-0104

EXPIRES: 8/31/85

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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 has been revised and was PORC approved on February 15, 1985, to improve recording and review of acceptance criteria and data recording of torque switch settings. The failed motor was returned to the Reliance Electric Motor factory for an additional failure analysis. The manufacturer's analysis indicated the motor failed due to overheating and that inadequate overload protection was involved. However, overload protection was adequate since the overloads operated at least four times during repetitive attempts to open the valve. During these attempts, the motor overheated which damaged the motor windings.

No further action is planned at this time.

Responsible Plant Section N/A

Previous Similar Events - None

TENNESSEE VALLEY AUTHORITY

Browns Ferry Nuclear Plant
P. O. Box 2000
Decatur, Alabama 35602

February 15, 1985

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

Dear Sir:

TENNESSEE VALLEY AUTHORITY - BROWNS FERRY NUCLEAR PLANT (BFN) UNIT 1 -
DOCKET NO. 50-259 - FACILITY OPERATING LICENSE DPR-33 - REPORTABLE
OCCURRENCE REPORT BFRO-50-259/84012 R2

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

6- G. T. Jones
Plant Manager
Browns Ferry Nuclear Plant

Enclosures

cc (Enclosures):

Regional Administrator
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NRC Resident Inspector, BFN