

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Browns Ferry - Unit 3	DOCKET NUMBER (2) 0 5 0 0 0 2 9 6	PAGE (3) 1 OF 0 3
---	---	-----------------------------

TITLE (4)
Inoperability of High Pressure Injection Systems

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 1 1	1 8	5 8	5 8	0 0 3	0 0 0	0 2	0 8	8 5			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 19 6	<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.405(c)	<input type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 73.71(b)					
	<input type="checkbox"/> 20.405(a)(1)(i)	<input type="checkbox"/> 50.36(c)(1)	<input checked="" type="checkbox"/> 50.73(a)(2)(v)	<input type="checkbox"/> 73.71(c)						
	<input type="checkbox"/> 20.405(a)(1)(ii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)						
	<input type="checkbox"/> 20.405(a)(1)(iii)	<input type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)							
	<input type="checkbox"/> 20.405(a)(1)(iv)	<input type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)							
	<input type="checkbox"/> 20.405(a)(1)(v)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)							

LICENSEE CONTACT FOR THIS LER (12)

NAME Pat Ebersole	TELEPHONE NUMBER
	AREA CODE: 2 0 5 NUMBER: 7 2 9 - 3 7 8 8

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

SUPPLEMENTAL REPORT EXPECTED (14)

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

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

During the scheduled surveillance test of the High Pressure Cooling Injection (HPCI) System, the time to reach rated flow was measured to be 10 seconds longer than the 25 seconds specified by the Surveillance Instruction. The HPCI system was, subsequently, declared inoperable.

Following HPCI inoperability, the Reactor Core Isolation Cooling (RCIC) System was tested and failed its acceptance criteria too. An orderly shutdown was begun while maintenance activities were initiated to return the HPCI and RCIC systems to service.

Repairs to the HPCI and RCIC systems were completed within the allotted time period, and the shutdown was discontinued.

8502200360 850208
PDR ADOCK 05000296
S PDR

IE 22
1/1

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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

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

Unit 1 was operating at 95 percent power, unit 2 was in a refueling outage, and unit 3 was operating at 96 percent power. This event affected unit 3 only, but similar circumstances were also found to be present on unit 1.

During performance of scheduled Surveillance Instruction (SI) 4.5.E.1.d and e on January 11, 1985, for unit 3, the time necessary for High Pressure Cooling Injection (HPCI) System (BJ) to reach rated flow was 35 seconds. This is 10 seconds longer than the criteria of 25 seconds specified in the SI; therefore, the HPCI system was declared inoperable. The failure investigation that followed determined that a limit switch on FCV 73-16 (FCV), which starts the auxiliary oil pump, and consequently, the HPCI turbine had been set incorrectly.

On December 9, 1984, maintenance was performed on FCV 73-16 (HPCI steam isolation valve) to reduce steam leakage. Repair of the valve requires removal of the Limitorque operator and removal of the valve's limit switches. Following maintenance the limit switch which starts the HPCI auxiliary oil pump was set incorrectly. A drawing discrepancy caused the craftsmen to set the switch to start the auxiliary oil pump when FCV 73-16 reached the full open position rather than when the valve started to open. A change to this drawing is being processed. This increased the time required for the HPCI system to achieve rated flow by approximately 15 seconds. The limit switch was reset correctly and HPCI operability was proven by successful performance of SI 4.5.E.1.d and e.

Following discovery of this problem on unit 3, units 1 and 2 were inspected for similar problems. On unit 2, the limit switch was set correctly; however, on unit 1 the same problem was noted.

On unit 1, the limit switch was apparently set incorrectly on June 24, 1984, following maintenance on FCV 73-16. The SI that measures the time for HPCI to reach rated flow had since been run successfully twice. Further investigation revealed that during this test the timing was begun when the auxiliary oil pump started. With correct limit switch setup, the start of the auxiliary oil pump and opening of FCV 73-16 would for practical purposes occur simultaneously. With an incorrect limit switch setup, the surveillance as performed was deficient in assessing system performance. This surveillance has been revised to ensure that the time to achieve rated flow will be measured from when the hand switch to FCV 73-16 is placed in the open position.

Following HPCI inoperability on unit 3, Technical Specifications (TS) require that the Reactor Core Isolation Cooling (RCIC) System (BN) operability be demonstrated immediately.

During performance of SI 4.5.F.1.b (RCIC pump operability) before the turbine is rolled, turbine trip capability is demonstrated by tripping the turbine trip throttle valve FCV 71-9 which isolates the steam supply to the RCIC turbine. After this valve was tripped, the limitorque operator would not reopen the valve. The failure of the operator was caused by a worn brass worm gear. The worn gear was replaced and RCIC system operability was proven after successful completion of SI 4.5.F.1.b and SI 4.5.F.1.c. The failure of the brass worm gear is the first of this type that has been observed on Limitorque operators. A program will be initiated to inspect other limitorque operators to determine if similar problems exist.

LICENSEE EVENT REPORT (LER), TEXT CONTINUATION

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

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

In addition, to ensure that the time required for HPCI to achieve rated flow will be within the Final Safety Analysis Report (FSAR) and SI limit of 25 seconds, additional post maintenance testing of the HPCI system will be performed when corrective maintenance is performed on the HPCI system. Specifically, anytime corrective maintenance which could effect HPCI start time is performed on components such as FCV 73-16, the HPCI flow controller, or the hydraulic system, SI 4.5.E.1.d and e will be included as part of the post maintenance testing of the HPCI system.

Safety implications of this event are that both HPCI and RCIC had simultaneous problems. However, both would have achieved rated flow conditions and injected to the vessel if required. HPCI would have started and injected 5000 gallons per minute into the vessel; however, the time to reach rated flow would have been approximately 35 seconds rather than 25 seconds as assumed by the FSAR. RCIC would have started and injected although had it subsequently tripped, restart capability was unlikely. Redundant Low Pressure Injection Systems and the Automatic Depressurization System were also available.

Responsible Plant Section - EM, MM

Previous Events - None

TENNESSEE VALLEY AUTHORITY

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

February 8, 1985

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

Dear Sir:

TENNESSEE VALLEY AUTHORITY - BROWNS FERRY NUCLEAR PLANT (BFN) UNIT 3 -
DOCKET NO. 50-296 - FACILITY OPERATING LICENSE DPR-68 - REPORTABLE
OCCURRENCE REPORT BFRO-50-296/85003

The enclosed report provides details concerning the inoperability of
the High Pressure Cooling Injection Systems. This report is submitted
in accordance with 10 CFR 50.73 (a)(2)(v).

Very truly yours,

TENNESSEE VALLEY AUTHORITY

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

Enclosures

cc (Enclosures):

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