NRC FORM 366 (6-1998) U.S. NUCLEAR REGULATORY COMMISSION

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LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Browns Ferry Nuclear Plant Unit 2	05000260	1 of 5

TITLE (4)

High Pressure Coolant Injection (HPCI) Inoperable due to a Failed Flow Controller

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER				FACILITY NAME	DOCKET NUMBER
									NA	
09	05	99	1999	008	00	10	08	99	NA	DOCKET NUMBER

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)									
			20.2201(b)		20.2203(a)(2)(v)		50.73(a)(2)(i)(B)		50.73(a)(2)(viii)		
POWER LEVEL (10)	100		20.2203(a)(1)		20.2203(a)(3)(i)		50.73(a)(2)(ii)		50.73(a)(2)(x)		
			20.2203(a)(2)(i)		20.2203(a)(3)(ii)		50.73(a)(2)(iii)		73.71		
			20.2203(a)(2)(ii)		20.2203(a)(4)		50.73(a)(2)(iv)		OTHER		
			20.2203(a)(2)(iii)		50.36(c)(1)	X	50.73(a)(2)(v)		Specify in Abstract below or in NRC Form 366A		
			20.2203(a)(2)(iv)		50.36(c)(2)		50.73(a)(2)(vii)				

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Gerald F. Moody, Licensing Project Manager	(256) 729-7534

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	BJ	CAP	GAO	Y						

SUPPLEMENTAL REPORT EXPECTED (14)			EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE).	X	NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On September 8, 1999, at approximately 0610 hours Central Daylight Time (CDT) during a routine control room board-walkdown, the Unit 2 Operator observed that the HPCI flow controller output signal indication was downscale. The HPCI system was immediately declared inoperable. The HPCI controller was replaced, HPCI operability testing was completed satisfactorily, and the system was returned to an operable status at approximately 1520 hours CDT on September 8, 1999. Upon investigation of data taken from the plant's Integrated Computer System history, it was determined that the controller began experiencing an erratic signal at approximately 1248 hours CDT on September 5, 1999. At approximately 1320 hours CDT on September 5, 1999, the controller lost power. During this event, HPCI was inoperable for a period of approximately three days out of the fourteen days allowed by the Technical Specifications Limiting Condition for Operation. During the period of time that HPCI was inoperable, all other required safety systems were operable and would have performed their design function if called upon. Accordingly, there was no significant reduction in the degree of protection provided to public health and safety.

This report is submitted pursuant to 10CFR50.73 (a)(2)(v) as a condition that alone could have prevented the fulfillment of the safety function of a structure or a system needed to mitigate the consequences of an accident.

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION	
Browns Ferry Nuclear Plant - Unit 2	05000260	1999	-- 008	-- 00	2 of 5

TEXT *(If more space is required, use additional copies of NRC Form 366A)* (17)

I. PLANT CONDITIONS

At the time of the discovery of this condition, Unit 2 was in Mode 1 at 100 percent power, approximately 3458 megawatts thermal. Unit 3 was in Mode 1 at 100 percent power, approximately 3456 megawatts thermal. Unit 1 was shutdown and defueled.

II. DESCRIPTION OF EVENT

A. Event:

On September 8, 1999, at approximately 0610 hours Central Daylight Time (CDT) during a routine control room boardwalk down, the Unit 2 Operator observed that the High Pressure Coolant Injection (HPCI) [BJ] flow controller, 2-FIC-73-33, output signal indication was downscale. Upon discovery of the failed controller, HPCI was immediately declared inoperable. As required by Technical Specifications, Browns Ferry Unit 2 entered a fourteen day Limiting Condition for Operation (LCO) for an inoperable HPCI system. The HPCI controller was replaced, HPCI operability testing was completed satisfactorily, and the system was returned to an operable status at approximately 1520 hours CDT on September 8, 1999.

A review of the plant's Integrated Computer System history showed that the controller began to experience an erratic signal at 1248 hours on September 5, 1999, and apparently failed at 1320 hours.

This report is submitted pursuant to 10CFR50.73 (a)(2)(v) as a condition that alone could have prevented the fulfillment of the safety function of a structure or a system needed to mitigate the consequences of an accident.

B. Inoperable Structures, Components, or Systems that Contributed to the Event:

Capacitor 2C3 in the power supply internal to the HPCI flow controller.

C. Dates and Approximate Times of Major Occurrences:

September 5, 1999 1248 hours CDT	HPCI flow controller began to experience an erratic signal.
September 5, 1999 1320 hours CDT	HPCI flow controller lost power.
September 8, 1999 0610 hours CDT	During a routine control room board walkdown, an Operator observed the HPCI flow controller output signal indication was downscale. HPCI was declared inoperable and a fourteen day Technical Specifications LCO was entered.
September 8, 1999 0952 hours CDT	HPCI system flow controller was replaced.

C. Dates and Approximate Times of Major Occurrences (continued):

September 8, 1999 1520 hours CDT	HPCI system operability testing was completed, the system was declared operable and the Technical Specifications LCO was exited.

D. Other Systems or Secondary Functions Affected:

None.

E. Method of Discovery

This condition was discovered during a routine walkdown of the Unit 2 control room panels.

F. Operator Actions

None.

G. Safety System Responses

None.

III. CAUSE OF THE EVENT

A. Immediate Cause

HPCI was declared inoperable due to a downscale indication on the system flow controller.

B. Root Cause

The root cause of the failure was most likely premature failure of capacitor 2C3.

IV. ANALYSIS OF THE EVENT

The HPCI flow controller, 2-FIC-73-33, is a GE model 540 series. On September 8, 1999, the malfunctioning controller was removed and examined in the shop. It has been concluded that the root cause of the failure was most likely the premature failure of capacitor 2C3. The capacitor in this circuit is a wet tantalum type capacitor which is an improved replacement for the aluminum electrolytic type which was originally used in this application. The capacitor had been installed in this controller less than sixty days prior to its failure. It had been replaced during a recent calibration of the controller.

V. ASSESSMENT OF SAFETY CONSEQUENCES

The HPCI system is designed to ensure that the reactor is adequately cooled to limit fuel cladding temperature in the event of a small pipe break in the nuclear system and a resulting loss of coolant which does not rapidly depressurize the reactor vessel. The HPCI system permits the nuclear plant to be shut down, while maintaining sufficient reactor vessel water inventory until the reactor vessel is depressurized. The HPCI system continues to operate until the reactor vessel is below the pressure at which Low Pressure

Coolant Injection (LPCI) [BO] operation or Core Spray (CS) [BM] operation maintains core cooling. In the event HPCI is not available or not sufficient to maintain reactor water level, the Automatic Depressurization system (ADS) [SB] functions to reduce reactor pressure so that flow from the LPCI and CS enters the reactor vessel in time to cool the core and limit fuel cladding temperature.

BFN Technical Specifications allow continued reactor operation for up to fourteen days if HPCI is inoperable, provided the ADS, CS, LPCI and Reactor Core Isolation Cooling (RCIC) [BN] systems are operable. RCIC provides an alternate supply of high pressure reactor coolant makeup while ADS would depressurize the reactor to allow CS and LPCI to provide adequate low pressure ECCS makeup to the reactor. The availability of these redundant and diversified systems provides adequate assurance of core cooling while the HPCI system is inoperable. During this event HPCI was inoperable approximately three days, two and one half hours out of the fourteen days allowed by the Technical Specifications LCO. These above required systems were operable and would have performed their design function if called upon. Accordingly, there was no significant reduction in the degree of protection provided to public health and safety.

VI. CORRECTIVE ACTIONS

A. Immediate Corrective Actions

Troubleshooting was initiated. The HPCI system flow controller was found to have failed. The controller was replaced and the HPCI system was run in accordance with the system operating instructions to verify proper operation of the new controller. Upon successful completion of the system run, HPCI was declared operable.

B. Corrective Actions to Prevent Recurrence

A review of data from the plant Integrated Computer System revealed that the failure of this controller had gone undetected for 5 shifts. The following corrective actions are intended to address this issue.

Integrated Computer System (ICS) [ID] data points which monitor this condition were added to the Unit 2 and Unit 3 Main Control Room alarm printer which is closely and frequently reviewed by Operations personnel. Additionally, training will be provided to Operations personnel to enhance their ability to more rapidly identify failures of this nature. [1]

VII. ADDITIONAL INFORMATION

A. Failed Components

The wet tantalum type capacitor 2C3 internal to the power supply in the HPCI flow controller (GE Model 540).

[1] TVA does not consider these corrective actions regulatory commitments. The completion of these items will be tracked in TVA's Corrective Action Program.

B. Previous LERs on Similar Events

A review of previous events for the past three years revealed no LERs that were the result of failed flow controllers.

C. Additional Information

None.

D. Safety System Functional Failure:

This event resulted in a safety system functional failure in accordance with draft NEI 99-02 Revision C.

VIII. COMMITMENTS

None.