NRC FORM 366 (4-95) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 04/30/98
ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20603.

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 Unit 3	05000296	1 OF 5

Engineered Safety Features Actuation As a Result of a Switch Failure

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 NAME	DOCKET NUMBER
03	10	1998	1998	002	00	04	09	98	FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)			
POWER LEVEL (10)	100	20.2201(b)	20.2203(a)(2)(v)	50.73(a)(2)(i)	50.73(a)(2)(viii)
		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)	X 50.73(a)(2)(iv)	OTHER
		20.2203(a)(2)(iii)	50.36(c)(1)	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)
G.M. Morrison, Industry Affairs Specialist	(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
A	ED	33	G080	NA						

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 March 10, 1998, Surveillance Instruction (SI) 3-SI-4.9.A.4.b(II), 4KV Shutdown Board Undervoltage Start of Diesel Generator Division II Test, was in progress. At approximately 1059 hours CST Operations personnel attempted to manually transfer 480V Shutdown Board 3B to its alternate supply in accordance with normal operating procedures. During the performance of the board transfer, the 480V Shutdown Board 3B alternate feeder breaker did not close as expected. This resulted in the momentary de-energization of 480V Shutdown Board 3B and all of its associated loads, including Reactor Protection System (RPS) bus B. The Primary Containment Isolation System groups associated with RPS bus B isolated as expected. Standby Gas Treatment System Trains A, B, and C and Control Room Emergency Ventilation System Train A automatically started as expected. The immediate cause of this event was the failure of the 480V Shutdown Board 3B alternate feeder breaker position switch to close. A mispositioned wire interfered with the proper operation of the switch close contacts. The most probable root cause of the wire being mispositioned, was improper wire routing and/or improper removal or installation of the switch cover which caused the wire to interfere with the switch contacts. Corrective actions include continuity testing and visual inspections on additional breaker position switches to verify proper switch operation, and revision of the maintenance instruction(s) applicable to GE type SB-1 switches to include appropriate wire routing guidance.

TVA is submitting this report pursuant to 10 CFR 50.73(a)(2)(iv) as an event or condition that resulted in a manual or automatic actuation of any engineered safety feature.

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

I. PLANT CONDITIONS

At the time the event occurred, Units 2 and 3 were in the Run Mode at 100 percent power. Unit 1 was shutdown and defueled.

II. DESCRIPTION OF EVENT

A. Event:

On March 10, 1998 surveillance instruction (SI) 3-SI-4.9.A.4.b(II), 4KV Shutdown Board Undervoltage Start of Diesel Generator Division II Test, was in progress. This test is performed to verify that an undervoltage condition on a 4KV Shutdown Board [ED] will start the associated diesel as required by Technical Specification Section 4.9.A.4.b. Prior to establishing an undervoltage condition on 4KV Shutdown Board 3EC, the SI provides for the transfer of loads normally supplied by the 4KV Shutdown Board to an alternate power supply to minimize the impact of the test on plant operations.

At approximately 1059 hours operations personnel attempted to manually transfer 480V Shutdown Board 3B to its alternate supply in accordance with normal operating procedures. During the performance of the board transfer, the 480V Shutdown Board 3B alternate feeder breaker did not close as expected. The normal feeder breaker was immediately reclosed. This resulted in the momentary de-energization of 480V Shutdown Board 3B and all of its associated loads, including Reactor Protection System (RPS)[JC] motor-generator set 3B. Upon the loss of power to RPS bus 3B, Unit 3 received a RPS half-scram and Primary Containment Isolation System (PCIS)[JM] groups 2, 3, 6 and 8 isolated as expected. Standby Gas Treatment System [BH] Trains A, B, and C and Control Room Emergency Ventilation System [VI] Train A automatically started as expected. Operations personnel immediately recognized the failure of the 480V Shutdown Board to transfer as the cause of the engineered safety features actuation. Operator response to the event proceeded in accordance with the plant abnormal operating instruction for loss of one RPS bus. Recovery from the event was completed at 1300 hours when all components were returned to the state which existed prior to the beginning of the SI.

On March 10, 1998, at 1348 hours (CST), TVA made a four-hour non-emergency notification to the NRC via the Emergency Notification System pursuant to 10 CFR 50.72(b)(2)(ii).

This report is submitted pursuant to 10 CFR 50.73(a)(2)(iv) as an event or condition which resulted in a manual or automatic actuation of any engineered safety feature.

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

None.

C. Dates and Approximate Times of Major Occurrences:

May 10, 1998 1059 hours CST	While performing a transfer of 480V Shutdown Board 3B to its alternate supply, the alternate feeder breaker fails to close. The deenergization of 480V Shutdown Board 3B results in a loss of power to RPS bus 3B.

C. Dates and Approximate Times of Major Occurrences, continued:

	PCIS Groups 2, 3, 6 and 8 isolate as expected and SBGT Trains A, B, and C and CREV Train A autostart.
March 10, 1998 1300 hours CST	Recovery from the event is completed. All components were returned to their pre-event status.
March 10, 1998 1348 hours CST	A four-hour non-emergency report is made to the NRC pursuant to 10 CFR 50.72(b)(2)(ii) .

D. Other Systems or Secondary Functions Affected:

None.

E. Method of Discovery:

Loss of RPS B was received in the Unit 3 control room at 1059 hours CST.

F. Operator Actions:

No operator actions contributed to occurrence of this event. Operator actions in response to the event were proper and in accordance with plant instructions.

G. Safety System Response:

All safety systems responded as expected.

III. CAUSE OF THE EVENT

A. Immediate Cause:

The immediate cause of this event was the failure of the 480V Shutdown Board 3B alternate feeder breaker position switch to close. A mispositioned wire interfered with the proper operation of the switch close contacts.

B. Root Cause:

The most probable root cause of the wire being mispositioned, was improper wire routing and/or improper removal or installation of the switch cover which caused the wire to interfere with the contacts.

C. Contributing Factors:

None.

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IV. ANALYSIS OF THE EVENT

The event was uncomplicated operationally. The half-scram event occurred on Unit 3 and involved the Unit 3 RPS bus 3B. A full scram was not initiated because RPS bus 3A remained energized throughout the event. The only impact of this event on Units 1 and 2 were Refuel Zone isolations and the autostart of the SGT and CREV systems which are the expected responses to the loss of RPS bus 3B. Operations personnel immediately recognized the cause of the ESF actuation and took appropriate actions in accordance with plant procedures. Proper communications and coordination took place between the Operations personnel in the Units 1, 2, and 3 control rooms. All initiations and actuations/isolations were consistent with and to be expected with the loss of RPS bus 3B.

V. ASSESSMENT OF THE SAFETY CONSEQUENCES

There were no actual or potential safety consequences associated with this event. The 480V Shutdown Board alternate feeder breaker position switch which failed does not perform a safety function. The failure of this switch would not have prevented the 480V Shutdown Board from performing its safety function. This event did not adversely affect the safety of plant personnel or the public.

VI. CORRECTIVE ACTIONS

A. Immediate Corrective Actions:

The wiring interference with the 480V Shutdown Board 3B alternate feeder breaker position switch was corrected and proper operation of the switch was verified.

B. Corrective Actions to Prevent Recurrence:

Continuity testing and visual inspections will be performed on a sample of breaker position switches on the remaining 480V Shutdown Boards to verify proper breaker position switch operation. Testing and inspections of additional switches may be performed based on the sample results.[1]

The maintenance instruction(s) applicable to GE type SB-1 switches will be revised to ensure appropriate wire routing guidance is incorporated.[1]

VII. ADDITIONAL INFORMATION

A. Failed Components:

Troubleshooting revealed that a wire was interfering with the proper operation of the alternate feeder breaker position switch closing contacts. The switch is a General Electric (GE) [G080] control and instrument switch, type SB-1. The type SB-1 switches are multi-stage rotary switches with cam-operated contacts. Each stage consists of a insulating barrier carrying one or two moving contacts and two or three cams on the operating shaft which move the contacts. The switch is provided with a protective cover which is removable for access to the switch terminals and contacts.

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

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A. **Failed Components, continued:**

Inspection of switch revealed a wire which was landed on the #2C switch terminal was in close proximity to the #2 moveable contact. The moveable contact was observed to move the wire out of the way when the switch was operated with the cover removed. However, with the cover installed sufficient interference was present to prevent contact closure. No maintenance or modification history was discovered relevant to condition of the switch. It was concluded that the most probable root cause of the event was improper wire routing and/or removal or replacement of the switch cover which caused the wire to interfere with the contacts. The absence of maintenance or modification history prevented the evaluation of human performance issues.

Figure 1 shows the wire impact point with moveable contact #2.

B. **Previous Similar Events:**

No previous LERs have resulted from GE type SB-1 switch failures at Browns Ferry.

VIII. COMMITMENTS

None.

Figure 1
Wire Interference With Alternate Feeder Breaker Position Switch Moveable Contact