

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Browns Ferry Nuclear Plant (BFN) Unit 1 DOCKET NUMBER (2) | PAGE (3) | 050002 | 5 | 910F | 06
TITLE (4) Diesel Generator Auto-started As A Result Of Breaker Cell Switch Operation.

EVENT DAY (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)								
MONTH	DAY	YEAR	YEAR	NUMBER	NUMBER	MONTH	DAY	YEAR	FACILITY NAMES	DOCKET NUMBER(S)							
0	2	12	19	3	0	0	2	0	0	3	1	1	9	3	N/A	050002	6
OPERATING MODE (9)			THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §:														
			(Check one or more of the following)(11)														
			20.402(b)			20.405(c)			X 50.73(a)(2)(iv)			73.71(b)					
POWER			20.405(a)(1)(i)			50.36(c)(1)			50.73(a)(2)(v)			73.71(c)					
LEVEL			20.405(a)(1)(ii)			50.36(c)(2)			50.73(a)(2)(vii)			OTHER (Specify in					
(10) 0 0 0			20.405(a)(1)(iii)			50.73(a)(2)(i)(B)			50.73(a)(2)(viii)(A)			Abstract below and in					
			20.405(a)(1)(iv)			50.73(a)(2)(ii)			50.73(a)(2)(viii)(B)			Text, NRC Form 366A)					
			20.405(a)(1)(v)			50.73(a)(2)(iii)			50.73(a)(2)(x)								

LICENSEE CONTACT FOR THIS LER (12)

NAME C. S. Hsieh, Compliance Licensing Engineer TELEPHONE NUMBER
AREA CODE 2 0 5 7 2 9 - 2 6 3 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

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE) X NO SUBMISSION DATE (15)

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

On February 12, 1993, diesel general D auto-started on undervoltage following an unexpected trip of shutdown bus 2 alternate feeder breaker. At the time of the event, the bus 2 normal feeder breaker had been removed from its compartment for periodic maintenance and performance of the maintenance resulted in actuation of the cell switch in the breaker board compartment. This in turn opened bus 2 alternate feeder breaker and deenergized bus 2. Deenergization of bus 2 led to an undervoltage transfer of 4kV shutdown board D to bus 1 and an undervoltage auto-start of diesel generator D. Concurrently, essential equipment cooling water pump A1 auto-started in response to the diesel generator start. This event is reportable in accordance with 10 CFR 50.73(a)(2)(iv) as a condition that resulted in automatic actuation of an engineered safety feature (ESF).

The root cause was inadequate procedures. The preventive maintenance instruction did not provide a caution to specify that operation of the cell switch could result in an ESF actuation. Contributing to the event was the mindset of the involved personnel that performance of this maintenance would not impact other equipment.

To prevent recurrence, TVA will revise the preventive maintenance program to require a bus outage to perform breaker compartment maintenance that could cause an ESF actuation. Additionally, a caution note regarding potential cell switch operation will be added to the electrical preventive instruction used to perform breaker compartment maintenance.

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Browns Ferry Unit 1	05010102159913	002	002 OF 06

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

I. PLANT CONDITIONS

Browns Ferry Units 1, 2, and 3 were shutdown and in a defueled condition. Unit 2 was in a refueling outage and its reactor cavity was flooded with the fuel pool-to-cavity gate removed.

Diesel generator C and 4kV shutdown board C were tagged out in association with control room design review activities.

II. DESCRIPTION OF EVENT

A. Event:

On February 12, 1993, at 1454 hours, diesel generator D [EK] auto-started on undervoltage following an unexpected trip of the shutdown bus 2 alternate feeder breaker [BKR].

In this event, Maintenance personnel were performing periodic maintenance in the breaker compartment for the 4kV shutdown bus 2 normal feeder breaker. During performance of these activities, the cell switch which interlocks the normal and alternate feeder breakers was activated, which caused the alternate feeder breaker to trip. This deenergized shutdown bus 2, which caused power loss to shutdown board D. As a result, shutdown board D transferred to its alternate power supply, shutdown bus 1, and diesel generator D auto-started. Concurrently, emergency equipment cooling water (EECW) pump A1 auto-started in response to the diesel generator start.

At approximately 1500 hours, diesel generator D and EECW pump A1 were reset and returned to standby readiness. The shutdown bus 2 alternate feeder breaker was reset to restore power to shutdown bus 2. Additionally, the normal to alternate power supply transfer switch was set to manual to allow operator control of shutdown bus 1.

This event is reportable in accordance with 10 CFR 50.73(a)(2)(iv) as a condition that resulted in automatic actuation of an engineered safety feature (ESF).

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Browns Ferry Unit 1	050002	5993	0001

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

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

None.

C. Dates and Approximate Times of Major Occurrences:

February 12, 1993 at 1300 hours CST	Breaker 1722 removed from its compartment for maintenance
February 12, 1993 at 1454 hours CST	Diesel Generator D and EECW Pump A1 auto-started
February 12, 1993 at 1500 hours CST	Reset diesel generator D and EECW pump A1; set transfer switch to manual
February 12, 1993 at 1744 hours CST	Four-hour report to NRC in accordance with 10 CFR 50.72(b)(2)(ii)

D. Other Systems or Secondary Functions Affected:

None.

E. Method of Discovery:

The operator immediately recognized the positive indication of the ESF actuations (diesel generator and EECW pump auto-start) in the control room.

F. Operator Actions:

Upon receipt of ESF indication in the control room, Operations personnel went to the 4kV board room to check status of the shutdown bus 2 alternate feeder breaker. The cause of the ESF was promptly identified and resolved.

G. Safety System Responses:

The plant systems responded as designed for loss of power to a shutdown bus.

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Browns Ferry Unit 1		05	00	02	00	00	04	06	06

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

III. CAUSE OF THE EVENT

A. Immediate Cause:

Shutdown bus 2 alternate feeder breaker tripped, which deenergized shutdown bus 2 resulting in the diesel generator/EECW pump start.

B. Root Cause:

The root cause of this event was inadequate procedures. The preventive maintenance instruction did not specify that performance of breaker compartment maintenance could operate the breaker cell switch and result in an ESF actuation.

C. Contributing Factors:

Contributing to the event was the apparent mindset of the personnel involved. Since the 4kV shutdown board C was tagged and deenergized, they believed that the work activity on shutdown bus 2 normal feeder breaker at 4kV shutdown board C would not impact any other equipment.

IV. ANALYSIS OF THE EVENT

The 4kV shutdown boards C and D are normally supplied from shutdown bus 2 and alternately supplied from shutdown bus 1. The normal and alternate supply breakers for the shutdown bus are interlocked using cell switches to prevent paralleling power sources. A diesel generator is primarily assigned to each 4kV shutdown board. In the event power is lost to shutdown bus 2, the shutdown boards are transferred to shutdown bus 1. Concurrently, the associated diesel generators and EECW pumps will auto-start. If power is not available on the alternate shutdown bus 1, the diesel generator breakers will close tying the diesel generator to the associated 4kV shutdown boards.

During this event, maintenance work was being performed on the shutdown bus 2 normal feeder breaker compartment. Manipulation of the cell switch in the breaker compartment signaled the alternate feeder breaker to open. This caused shutdown bus 2 to deenergize resulting in power loss to 4kV shutdown board D. Power loss to shutdown board D initiated both undervoltage auto-start of diesel generator D and undervoltage transfer to shutdown bus 1. Since shutdown bus 1 was energized, the diesel generator breaker performed as designed and did not close to connect diesel generator D to 4kV shutdown board D. The conservative actuation of the ESF related components did not adversely affect the health and safety of the public or plant personnel. All equipment responded and performed as designed.

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Browns Ferry Unit 1	0500025993	002	00

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

V. CORRECTIVE ACTIONS

A. Immediate Corrective Actions:

The shutdown bus 2 alternate feeder breaker was reset to restore power to shutdown bus 2. The normal to alternate power supply transfer switch was set to manual to prevent automatic return of 4kV shutdown board D back to shutdown bus 2.

B. Corrective Actions to Prevent Recurrence:

TVA will revise the preventive maintenance program to require a bus outage to perform breaker compartment maintenance that could cause an ESF actuation due to operation of the cell switch. In addition, a caution note regarding potential cell switch operation will be added to the electrical preventive instruction involved in this event. Finally, Operations personnel, electrical craft and planners will also review this incident.

VI. ADDITIONAL INFORMATION

A. Failed Components:

None.

B. Previous LERs on Similar Events:

None.

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		050002	0006

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

VII. COMMITMENTS

1. TVA will revise the preventive maintenance program to require a bus outage to perform breaker compartment maintenance that could cause an ESF actuation due to operation of the cell switch by July 15, 1993.
2. A caution note regarding potential cell switch operation will be added to the electrical preventive instruction for maintenance on General Electric (Magne-Blast) switchgear and circuit breakers by July 15, 1993.
3. Operations personnel, electrical craft, and electrical planners will review this incident by June 15, 1993.

Energy Industry Identification System (EIIS) codes are identified in the text as [XX].