



Tennessee Valley Authority, Post Office Box 2000, Decatur, Alabama 35609-2000

September 17, 2012

10 CFR 50.73

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

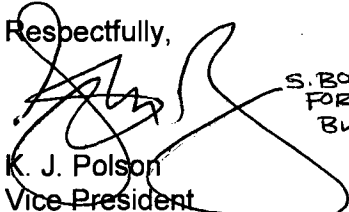
Browns Ferry Nuclear Plant, Unit 2
Facility Operating License No. DPR-52
NRC Docket No. 50-260

Subject: **Licensee Event Report 50-260/2012-003-00**

The enclosed Licensee Event Report (LER) provides details of the 480V reactor motor operated valve board 2E failure to manually transfer to alternate power. The Tennessee Valley Authority (TVA) is submitting this report in accordance with 10 CFR 50.73(a)(2)(i)(B). The causal analysis for this event is ongoing. Upon completion of the causal analysis, TVA will submit a supplement to this LER.

There are no new regulatory commitments contained in this letter. Should you have any questions concerning this submittal, please contact J. E. Emens, Jr., Nuclear Site Licensing Manager, at (256) 729-2636.

Respectfully,


S. BONO
FOR K. POLSON
BY DIRECTION

K. J. Polson
Vice President

Enclosure: Licensee Event Report 50-260/2012-003-00 - 480V Reactor Motor Operated Valve Board 2E Failed to Manually Transfer to Alternate Power

cc (w/Enclosure):

NRC Regional Administrator - Region II
NRC Senior Resident Inspector - Browns Ferry Nuclear Plant

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NRR

ENCLOSURE

**Browns Ferry Nuclear Plant
Unit 2**

Licensee Event Report 50-260/2012-003-00

**480V Reactor Motor Operated Valve Board 2E Failed to Manually Transfer to
Alternate Power**

See Attached

LICENSEE EVENT REPORT (LER)

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to FOIA/Privacy Section (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects.resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

1. FACILITY NAME Browns Ferry Nuclear Plant (BFN), Unit 2	2. DOCKET NUMBER 05000260	3. PAGE 1 of 7
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4. TITLE: 480V Reactor Motor Operated Valve Board 2E Failed to Manually Transfer to Alternate Power

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
07	10	2012	2012	- 003	- 00	09	17	2012	N/A	05000
									FACILITY NAME	DOCKET NUMBER
									N/A	05000

9. OPERATING MODE 1	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: <i>(Check all that apply)</i>										
	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)							
10. POWER LEVEL 100	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)							
	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)							
	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)							
	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)							
	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)							
	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)							
<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> OTHER								
<input type="checkbox"/> 20.2203(a)(2)(vi)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	<small>Specify in Abstract below or in NRC Form 366A</small>								

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME Eric Bates, Licensing Engineer	TELEPHONE NUMBER (Include Area Code) 256-614-7180
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13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

14. SUPPLEMENTAL REPORT EXPECTED	15. EXPECTED SUBMISSION DATE
<input checked="" type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE) <input type="checkbox"/> NO	MONTH: 02 DAY: 15 YEAR: 13

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

On July 10, 2012, the alternate power supply for the Browns Ferry Nuclear Plant (BFN), Unit 2, 480V reactor motor operated valve (RMOV) board 2E was declared inoperable for performance of preventive maintenance (PM) activities. During these PM activities, the alternate feeder breaker was racked in and out of the cubicle. When the alternate feeder breaker was racked in after performance of PM activities, the manual trip pushbutton remained in the depressed position.

On July 19, 2012, at approximately 0303 hours Central Daylight Time, while preparing to perform PM activities, the BFN, Unit 2, 480V RMOV board 2E failed to manually transfer to its alternate power supply. Operations discovered the alternate feeder breaker manual trip pushbutton in the depressed position. The alternate feeder breaker would not close with this manual trip pushbutton in the depressed position. As a result, the BFN, Unit 2, 480V RMOV board 2E would not manually transfer and would also not have automatically transferred to its alternate power supply. The alternate feeder breaker manual trip pushbutton position was corrected, and the BFN, Unit 2, 480V RMOV board 2E was transferred to its alternate power supply for performance of PM activities.

The causal analysis for this event is ongoing. Upon completion of the causal analysis, the Tennessee Valley Authority will submit a supplement to this Licensee Event Report.

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NARRATIVE

I. PLANT CONDITION(S)

At the time the event was identified, Browns Ferry Nuclear Plant (BFN), Unit 2, was in Mode 1 at approximately 100 percent power.

II. DESCRIPTION OF EVENT

A. Event

On July 10, 2012, at 0817 hours Central Daylight Time (CDT), the alternate power supply [JX] (2EA low pressure coolant injection (LPCI) motor generator (MG) [MG] set) for the BFN, Unit 2, 480V reactor motor operated valve (RMOV) board 2E [ED] was declared inoperable for performance of preventive maintenance (PM) activities. During these PM activities, the alternate feeder breaker [BKR] was racked in and out of the cubicle. When the alternate feeder breaker was racked in after performance of PM activities, the manual trip pushbutton remained in the depressed position. Without recognizing the alternate feeder breaker manual trip pushbutton was in the depressed position, Operations declared the BFN, Unit 2, 480V RMOV board 2E Operable on July 11, 2012, at 0230 hours CDT.

On July 19, 2012, at approximately 0303 hours CDT, while preparing to perform PM activities, the BFN, Unit 2, 480V RMOV board 2E failed to manually transfer to its alternate power supply. Operations personnel discovered the alternate feeder breaker manual trip pushbutton in the depressed position. The alternate feeder breaker would not close with this manual trip pushbutton in the depressed position. As a result, the BFN, Unit 2, 480V RMOV board 2E would not manually transfer and would also not have automatically transferred to its alternate power supply as required by Technical Specification (TS) Surveillance Requirement 3.5.1.12. The manual trip pushbutton position was corrected, and the BFN, Unit 2, 480V RMOV board 2E was transferred to its alternate power supply for performance of PM activities.

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

The BFN, Unit 2, 480V RMOV board 2E failed to transfer to its alternate power supply due to the alternate feeder breaker manual trip pushbutton being in the depressed position.

C. Dates and Approximate Times of Major Occurrences

July 10, 2012, at 0817 hours CDT The 2EA LPCI MG set for BFN, Unit 2, 480V RMOV board 2E declared inoperable for performance of PM activities.

July 10, 2012, at 1748 hours CDT While declared inoperable to support PM activities, the BFN, Unit 2, 480V RMOV board 2E alternate feeder breaker is reinstalled and the manual trip pushbutton remains in the depressed position.

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July 11, 2012, at 0230 hours CDT Without recognizing the alternate feeder breaker manual trip pushbutton was in the depressed position, Operations declared BFN, Unit 2, 480V RMOV board 2E Operable.

July 19, 2012, at 0303 hours CDT The BFN, Unit 2, 480V RMOV board 2E failed to manually transfer to its alternate power supply. The BFN, Unit 2, 480V RMOV board 2E automatic transfer capability was restored when the alternate feeder breaker manual trip pushbutton position was corrected.

D. Other Systems or Secondary Functions Affected

The inability to automatically transfer power for the BFN, Unit 2, 480V RMOV board 2E results in the deenergization of the board if the normal power supply fails. This has the potential to impact the ability to supply power to the associated LPCI subsystem injection valve, residual heat removal (RHR) minimum flow valve, and the recirculation pump discharge valve.

E. Method of Discovery

This condition was discovered while manually transferring the BFN, Unit 2, 480V RMOV board 2E to its alternate power supply for performance of PM activities.

F. Operator Actions

While Operations personnel were performing the manual transfer of the BFN, Unit 2, 480V RMOV board 2E to its alternate power supply, the BFN, Unit 2, 480V RMOV board 2E failed to transfer to its alternate power supply. Operations personnel found the alternate feeder breaker manual trip pushbutton in the depressed position. The alternate feeder breaker manual trip pushbutton position was corrected, and the BFN, Unit 2, 480V RMOV board 2E was transferred to its alternate power supply.

G. Safety System Responses

There were no safety system responses for this condition.

III. CAUSE OF THE EVENT

A. Immediate Cause

The immediate cause was determined to be the manual trip pushbutton failed to release from the depressed position due to binding in the racking mechanism of the alternate feeder breaker.

B. Root Cause

The causal analysis for this event is ongoing. Upon completion of the causal analysis, the Tennessee Valley Authority (TVA) will submit a supplement to this Licensee Event Report (LER) with the root cause. The evaluation to determine the cause of the binding in the racking mechanism is scheduled to be completed by

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January 15, 2013. Therefore, the supplement date for this LER is planned for February 15, 2013

C. Contributing Factors

The causal analysis for this event is ongoing. Upon completion of the causal analysis, TVA will submit a supplement to this LER with the contributing factors.

IV. ANALYSIS OF THE EVENT

The TVA is submitting this report in accordance with the Title 10 of the Code of Federal Regulations (10 CFR) 50.73(a)(2)(i)(B), as any operation or condition which was prohibited by the plant's Technical Specifications.

When the alternate feeder breaker is racked in and out of the cubicle, a racking shutter is manually opened to allow access for the racking tool to get to the racking mechanism located on the front of the alternate feeder breaker. When the racking shutter is lifted, linkages within the alternate feeder breaker depress the manual trip pushbutton. This is a safety feature that prevents racking out a closed breaker. Prior to discovery of the inability to manually transfer the BFN, Unit 2, 480V RMOV board 2E to its alternate power supply, the last time the alternate feeder breaker was racked in was on July 10, 2012, at 1748 hours CDT.

As a result of performing a past operability evaluation on the BFN, Unit 2, 480V RMOV board 2E, it was determined that the BFN, Unit 2, 480V RMOV board 2E would have been unable to perform its safety function from July 10, 2012, at 1748 hours CDT, when the manual trip pushbutton was last determined to be depressed, until July 19, 2012, at 0303 hours CDT, when the manual trip pushbutton position was corrected, i.e., released. However, on July 10, 2012, at 0817 hours CDT, the 2EA LPCI MG set for BFN, Unit 2, 480V RMOV board 2E was declared inoperable for performance of PM activities and TS 3.8.7, Distribution Systems - Operating, Condition C and TS 3.5.1, ECCS - Operating, Condition A were entered. As a result, on July 10, 2012, at 1748 hours CDT, compliance with the Required Actions and associated Completion Times of TS 3.8.7 Condition C and TS 3.5.1 Condition A should have been maintained.

The BFN, Unit 2, TS 3.8.7 requires that the BFN, Unit 2, 480V RMOV board 2E to be Operable in Modes 1, 2, and 3 to ensure that: (1) acceptable fuel design limits and reactor coolant pressure boundary limits are not exceeded as a result of abnormal operational transients; and (2) adequate core cooling is provided, and containment Operability and other vital functions are maintained in the event of a postulated design basis accident. When the BFN, Unit 2, 480V RMOV board 2E is inoperable, TS 3.8.7 Required Action C.1 requires the affected RHR [BO] subsystem to be declared inoperable for LPCI immediately.

The BFN, Unit 2, TS 3.5.1 requires each emergency core cooling systems (ECCS) [BJ][BM] injection/spray subsystem and the Automatic Depressurization System (ADS) [SB] function of six safety/relief valves to be Operable in Mode 1, and in Modes 2 and 3, except High Pressure Coolant Injection System and ADS valves are not required to be Operable with reactor steam dome pressure less than or equal to 150 pound-force per square inch gauge (psig). With one low pressure ECCS injection/spray subsystem

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inoperable, TS 3.5.1 Required Action A.1 requires the low pressure ECCS injection/spray subsystem to be restored to Operable status in 7 days. If the low pressure ECCS injection/spray subsystem cannot be restored to Operable status in 7 days, TS 3.5.1 Required Actions B.1 and B.2 require the unit to be in Mode 3 in 12 hours and in Mode 4 in 36 hours.

As a result of overlapping inoperabilities (i.e., 2EA LPCI MG set inoperable for performance of PM activities and the inoperability of the automatic transfer capability of the BFN, Unit 2, 480V RMOV board 2E), the associated RHR subsystem was inoperable from July 10, 2012, at 0817 hours CDT until July 19, 2012, at 0303 hours CDT. After July 17, 2012, at 2017 hours CDT, BFN, Unit 2, operated with an inoperable RHR subsystem for longer than allowed by TS.

In addition, the alternate feeder breaker is credited in the Appendix R Fire Safe Shutdown Analysis for Fire Area 2-6.

V. ASSESSMENT OF SAFETY CONSEQUENCES

The alternating current electrical power distribution subsystems require the associated buses [BU] and electrical circuits to be energized to their proper voltages. In addition, for the BFN, Unit 2, 480V RMOV board 2E to be operable, it must be able to automatically transfer on the loss of voltage. This feature ensures that the failure of one emergency diesel generator (EDG) [EK] will not result in the loss of a RHR subsystem. With the BFN, Unit 2, 480V RMOV board 2E unable to transfer, the RHR Loop II subsystem was inoperable for LPCI. The RHR Loop II injection valve [INV] receives power from the BFN, Unit 2, 480V RMOV board 2E. Therefore, with the inability of the BFN, Unit 2, 480V RMOV board 2E to transfer to the alternate power supply, the failure of one EDG could have prevented the RHR Loop II injection valve from opening.

The D EDG is the normal safety related power supply for the 480V Shutdown Board 2B and the 2EN LPCI MG set. The 2EN LPCI MG set is the normal power supply for the BFN, Unit 2, 480V RMOV board 2E. The D EDG was available during the time the automatic transfer capability was inoperable. Therefore, the safety related supply was available to the BFN, Unit 2, 480V RMOV board 2E from July 10, 2012, at 1748 hours CDT until July 19, 2012, at 0303 hours CDT, when the alternate feeder breaker manual trip pushbutton was released. When the failure to transfer the BFN, Unit 2, 480V RMOV board 2E was identified, Operations personnel were able to diagnose and correct the condition.

The automatic transfer of the power supply for the LPCI inboard injection valves, RHR minimum flow valves, and recirculation pump discharge valves was once a requirement to comply with 10 CFR 50 Appendix K, ECCS Evaluation Models, and 10 CFR 50.46, Acceptance Criteria For Emergency Core Cooling Systems For Light-Water Nuclear Power Reactors, using older Loss of Coolant Accident (LOCA) analysis methods.

Based on improved LOCA analysis methods, the automatic transfer of power is no longer required. This is demonstrated in the AREVA LOCA Break Spectrum Analysis for BFN, Units 1, 2, and 3. This analysis does not require the automatic transfer of the

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power supply for the LPCI inboard injection valves, RHR minimum flow valves, and recirculation pump discharge valves.

For the Appendix R Fire Safe Shutdown function, a roving fire watch was in place during the time that the alternate feeder breaker was not able to perform its safety function.

Therefore, TVA concluded that there was minimal safety significance for this condition.

VI. CORRECTIVE ACTIONS - The corrective actions are being managed by TVA's corrective action program.

A. Immediate Corrective Actions

The alternate feeder breaker manual trip pushbutton position was corrected and the BFN, Unit 2, 480V RMOV board 2E was transferred to its alternate power supply.

B. Corrective Actions to Prevent Recurrence

The causal analysis for this event is ongoing. Upon completion of the causal analysis, TVA will submit a supplement to this LER with the corrective actions to prevent recurrence.

VII. ADDITIONAL INFORMATION

A. Failed Components

The causal analysis for this event is ongoing. Upon completion of the causal analysis, TVA will submit a supplement to this LER to include any failed components.

B. Previous Similar Events

A search of LERs for BFN, Units 1, 2, and 3, for approximately the past five years identified LER 50-260/2009-005-00, Reactor Motor Operated Valve Board and Residual Heat Removal Subsystem Inoperable Longer Than Allowed by the Plant's Technical Specifications. The corrective action to prevent recurrence for LER 50-260/2009-005-00 includes the revision to the operating instructions governing plant startup to require that the Emergency Control Switch be verified prior to entry into Mode 3 or 2.

A search on similar conditions of Problem Evaluation Reports (PERs) for BFN, Units 1, 2, and 3, for approximately the past five years identified PERs 176648, 293444, 535537, and 536061.

C. Additional Information

The corrective action document for this report is PER 581478.

D. Safety System Functional Failure Consideration

In accordance with NEI 99-02, this condition is not considered a safety system functional failure.

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E. Scram With Complications Consideration

This condition did not include a reactor scram.

VIII. COMMITMENTS

There are no commitments.