



Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402

Joseph R. Bynum
Vice President, Nuclear Operations

FEB 08 1991

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

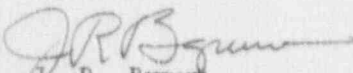
Dear Sir:

TVA - BROWNS FERRY NUCLEAR PLANT (BFN) UNIT 1 - DOCKET NO. 50-259 -
FACILITY OPERATING LICENSE DPR-33 - REPORTABLE OCCURRENCE REPORT
BFRO-50-259/91001

The enclosed report provides details concerning the failure of two trains of the standby power system to load sequence; thereby creating the potential for a loss of critical safety functions. This report is submitted in accordance with 10 CFR 50.73(a)(2)(ii), 10 CFR 50.73(a)(2)(v) and 10 CFR 50.73(a)(2)(vii).

Very truly yours,

TENNESSEE VALLEY AUTHORITY


J. R. Bynum

Enclosure
cc: see page 2

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U.S. Nuclear Regulatory Commission

cc (Enclosure):

INPO Records Center
Suite 1500
1100 Circle 75 Parkway
Atlanta, Georgia 30339

NRC Resident Inspector, BFN

Regional Administration
U.S. Nuclear Regulatory Commission
Office of Inspection and Enforcement
Region II
101 Marietta Street, Suite 2900
Atlanta, Georgia 30323

Thierry M. Ross
U.S. Nuclear Regulatory Commission
One White Flint, North
11555 Rockville Pike
Rockville, Maryland 20852

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Browns Ferry Unit 1
TITLE (4)
DOCKET NUMBER (2) | PAGE (3)
10510101 2 | 5 | 9 | 1 | 0 | 1 | 0 | 4

EVENT DAY (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)														
MONTH	DAY	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES			DOCKET NUMBER(5)												
0	1	0	2	9	1	9	1	0	0	1	0	0	0	2	0	8	9	1	Browns Ferry Unit 2	10510101	2	6	
																			Browns Ferry Unit 3	10510101	2	9	6

OPERATING MODE (9) THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more of the following)(11)

<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 checked="" type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> OTHER (Specify in
<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)	Abstract below and in
<input type="checkbox"/> 20.405(a)(1)(iv)	<input checked="" type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)	Text, NRC Form 366A)
<input type="checkbox"/> 20.405(a)(1)(v)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
Earl M. Ridgell, Engineer, Compliance Licensing	2 0 5 7 2 9 - 2 0 4 7

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	
HX	E	K	R	L	Y	G	O	B	O	Y

SUPPLEMENTAL REPORT EXPECTED (14) YES (If yes, complete EXPECTED SUBMISSION DATE) | X | NO

EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR

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

On December 27, 1990, during the performance of diesel generator "A" load acceptance test the shutdown board "A" diesel generator voltage available relays (DGVA) failed to stay energized. On December 31, 1990, during the performance of diesel generator "D" load acceptance test, the shutdown board "D" DGVA relays failed to energize. Investigations showed the breaker stationary auxiliary switch contacts failed to close when the diesel generator breaker closed. The combination of these two events could have resulted in a failure of both core spray pumps to start, resulting in the potential loss of both loops of a critical safety function.

The root cause of this event was an unexpected failure affecting the reliability of the equipment.

Corrective actions include the addition of parallel redundant contacts on the Unit 1 and Unit 2 shutdown boards and an evaluation of the Unit 3 shutdown boards. In addition, preventative maintenance procedures will be modified to include a visual inspection of these switches.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		SEQUENTIAL	REVISION		
		YEAR	NUMBER	NUMBER	
Browns Ferry Unit 1	050003 25991	001	00	00	2 of 4

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

DESCRIPTION OF EVENT

On December 27, 1990, Operations personnel were performing a diesel generator load acceptance test on diesel generator "A". During the performance of this test the shutdown board "A" diesel generator voltage available (DGVA) relays failed to stay energized. Based on the initial energizing of the DGVA relays residual heat removal (RHR) [BG] pump 2A started automatically as expected. However, the core spray (CS) [BG] and emergency equipment cooling water (EECW) [BI] pumps did not start and the load shed logic did not function as designed.

Investigations revealed the DGVA signal was lost after approximately 0.5 seconds. This duration permitted the RHR pump to auto start at a time delay of 0.3 seconds but would not permit the CS pump (time delay 7 seconds) or EECW pump (time delay 14 seconds) to start.

Further investigations did not determine the cause of the DGVA signal failure. The diesel output breaker was closed several times and the DGVA relays energized each time as designed. Physical examination of the diesel output breaker showed no anomalies.

Since the failure could not be repeated, the test was repeated on December 29, 1990, with plant personnel closely monitoring the DGVA relays. This test was completed successfully and testing of the remaining diesel generators was initiated.

On December 31, 1990, during diesel generator load acceptance test on diesel generator "D," no loads sequenced onto the diesel generator and load shedding did not occur. Investigations showed the DGVA relays were not energized due to the breaker stationary auxiliary switch contact (General Electric (GE) type SBM switch) failing to close properly when the diesel generator breaker closed. Subsequent troubleshooting showed all other contacts were in the correct position for the position of the breaker.

The breaker was racked out and a detailed inspection was performed by both TVA personnel and a GE representative. These inspections failed to identify any problem with the switch. The breaker was then racked in and reclosed. At this time, the DGVA relays energized as designed. The switch was replaced and the diesel generator load acceptance test was successfully repeated on January 4, 1991.

All three units at BFN were shutdown and defueled at the time of this event and no fuel handling or other operations over the spent fuel were in progress. The combination of these two events could have resulted in a failure of both core spray pumps to start, resulting in the potential loss of both loops of a critical safety function and is reportable in accordance with 10 CFR 50.73(a)(2)(ii), 10 CFR 50.73(a)(2)(v) and 10 CFR 50.73(a)(2)(vii).

(6-89)

Expires 4/30/92

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

Table with 4 main columns: FACILITY NAME (1), DOCKET NUMBER (2), LER NUMBER (6), and PAGE (3). Sub-columns include SEQUENTIAL, REVISION, YEAR, and NUMBER. Row 1: Browns Ferry Unit 1, 0500025991, 001001, 3 OF 4.

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

ANALYSIS OF EVENT

The standby AC power system [EK] provides a self-contained highly reliable source of power for engineered safeguards systems such that no single credible event can disable the core standby cooling functions or their supporting auxiliaries. This system includes the diesel generators and the load shed and sequencing logic. During this event, the standby AC power system failed to operate as designed, since load shedding and sequencing did not occur.

The failures of the stationary auxiliary switches for diesel generators "A" and "D" occurred during testing and were separate events. However, due to the similarity in the failures of the relays, the potential existed for a simultaneous occurrence. A simultaneous occurrence would have resulted in the failure of shutdown boards "A" and "D" to initiate load shed logic and load sequencing to support a loss of offsite power event concurrent with an accident signal. This would prevent an auto start of both CS loops, RHR pumps "A" and "D", and the RHR service water pumps assigned to the boards. However, load shedding for all shutdown boards would occur if initiated by any diesel generator.

The described conditions could have prevented fulfillment of the safety functions of systems required to mitigate the consequences of an accident. Specifically, the failure of all core spray pumps to start would result in a loss of the safety function of core cooling following a recirculation pump line break.

At this time, all three units are shutdown and defueled. In addition, the failures occurred at a time in which these safety systems were not required to be operable, and no similar failures have occurred during previous tests which could raise doubts about equipment operability during past plant operations. Also, these circuits were previously verified to function on November 6, 1990.

Based on the present status of the units, there were no safety consequences resulting from these events. However, the implication exists that if these events had occurred simultaneously during power operation then the result could have been operation outside of the design basis.

CAUSE OF EVENT

The root cause of this condition was the unexpected failures of two switches.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)				PAGE (3)				
		YEAR	NUMBER	REVISION NUMBER						
									SEQUENTIAL	REVISION
Browns Ferry Unit 1	0500025991	0	0	1	0	0	0	4	0	4

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

CORRECTIVE ACTIONS

The following corrective actions will be [or have been] taken based on this event.

First, since the stationary auxiliary switches worked properly in November 1990, TVA concludes regular preventative maintenance and surveillance might not minimize the failure possibilities. Therefore, in order to insure the DGVA relays energize correctly, a redundant contact, located on the breaker mounted auxiliary switch of the diesel generator output breaker, has been installed in parallel with the existing contact. In addition, a similar design has been implemented for the normal voltage available relays which could also initiate load sequencing.

Second, while Unit 3 shutdown boards have a similar logic and relay scheme, the stationary switches are of a different type (GE SBI) than those that failed in Units 1 and 2. Also, the circuits in Unit 3 do not initiate automatic actions required for Unit 2 safe shutdown. Therefore, no action is required on the Unit 3 boards for Unit 2 operation. However, Unit 3 operation cannot be permitted until either the system has been deemed acceptable or a similar modification has been implemented on the appropriate Unit 3 boards. TVA will monitor the reliability of the SBI switches installed as stationary auxiliary switches in the Unit 3 shutdown boards and take any corrective actions needed prior to the restart of Unit 3.

Finally, even though TVA concluded that preventative maintenance may not have prevented the observed switch failures, TVA will revise preventative maintenance procedures to include a visual inspection of the switches during the once per outage breaker inspections. The procedure revisions will be completed prior to April 1, 1991.

PREVIOUS SIMILAR EVENTS

No previous similar events.

COMMITMENTS

The following commitments are made in this LER.

BFN will evaluate the Unit 3 stationary auxiliary switches and take any corrective actions necessary prior to the restart of Unit 3.

BFN will revise preventative maintenance procedures to include a visual inspection of the stationary auxiliary switches, during the once per outage breaker inspections, prior to April 1, 1991.