

TENNESSEE VALLEY AUTHORITY

Browns Ferry Nuclear Plant  
Post Office Box 2000  
Decatur, Alabama 35609-2000  
January 11, 1990

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

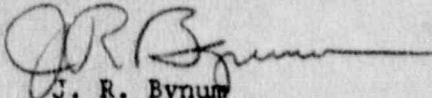
Dear Sir:

TVA - BROWNS FERRY NUCLEAR PLANT (BFN) UNIT 2 - DOCKET NO. 50-260 - FACILITY  
OPERATING LICENSE DPR-52 - REPORTABLE OCCURRENCE REPORT BFR0-50-260/89029

The enclosed report provides details concerning failure of a residual heat  
removal service water sump pump level switch which resulted in a condition  
prohibited by technical specifications. This report is submitted in  
accordance with 10 CFR 50.73(a)(2)(i)(B).

Very truly yours,

TENNESSEE VALLEY AUTHORITY

  
J. R. Bynum  
Vice President  
Nuclear Power Production

Enclosure

cc (Enclosure):

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

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

NRC Resident Inspector, BFN

9001190027 900111  
PDR ADOCK 05000260  
S PDC

## LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) BROWNS FERRY UNIT 2 DOCKET NUMBER (2) 0500026010F04 PAGE (3) 4TITLE (4) FAILURE OF RESIDUAL HEAT REMOVAL SERVICE WATER SUMP PUMP LEVEL SWITCH RESULTED IN A CONDITION PROHIBITED BY TECHNICAL SPECIFICATIONS

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(S)	
11	21	1989	029	00	01	11	1990		0500026010F04	

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

POWER LEVEL (10)	<u>0</u>	<u>0</u>	<u>0</u>	<u>20.402(b)</u>	<u>20.405(a)(1)(i)</u>	<u>50.36(c)(1)</u>	<u>50.73(a)(2)(iv)</u>	<u>73.71(b)</u>
				<u>20.405(a)(1)(ii)</u>	<u>50.36(c)(2)</u>	<u>50.73(a)(2)(v)</u>	<u>73.71(c)</u>	
				<u>20.405(a)(1)(iii)</u>	<u>X 50.73(a)(2)(i)</u>	<u>50.73(a)(2)(vii)</u>	<u>OTHER (Specify in</u>	
				<u>20.405(a)(1)(iv)</u>	<u>50.73(a)(2)(ii)</u>	<u>50.73(a)(2)(viii)(A)</u>	<u>Abstract below and in</u>	
				<u>20.405(a)(1)(v)</u>	<u>50.73(a)(2)(iii)</u>	<u>50.73(a)(2)(viii)(B)</u>	<u>Text, NRC Form 366A)</u>	
						<u>50.73(a)(2)(x)</u>		

## LICENSEE CONTACT FOR THIS LER (12)

NAME Michael Lalor, Compliance Licensing Engineer TELEPHONE NUMBER 205729-2071  
AREA CODE 205

## 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  EXPECTED SUBMISSION DATE (15) 

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

At approximately 0215 hours on December 21, 1989, the required number of residual heat removal service water (RHRSW) pumps available was found to be less than that required because of the loss of two redundant RHRSW sump pumps. One sump pump was out of service because of modifications to replace its level switch, and the redundant sump pump failed causing the RHRSW pump room sumps to overfill. The associated RHRSW pumps are considered to be technically inoperable without the support of their sump pumps. This left only one operable RHRSW pump aligned to the operable loop of residual heat removal (RHR), in violation of the technical specifications, since the other RHRSW pumps of that RHR loop were out of service because of maintenance and modifications.

During this event, units 1 and 3 were defueled, and unit 2 was in cold shutdown with fuel in the reactor vessel and the head removed.

The cause of the event was the failure of the level switch associated with RHRSW sump pump B1 to actuate on high sump water level. The control switch position for the RHRSW sump pump was changed from automatic to manual, which started the pump and returned the sump level to normal. The level switch was calibrated, and the RHRSW sump pump and associated RHRSW pumps were returned to an operable condition at 0600 hours on December 22, 1989. A design change notice had been issued prior to this event to replace the level switches for each RHRSW sump pump before unit 2 restart.



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TEXT CONTINUATION

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		SEQUENTIAL		REVISION							
		YEAR	NUMBER	NUMBER	NUMBER	NUMBER	NUMBER				
BROWNS FERRY UNIT 2	0500026089	0	2	9	0	0	0	2	OF	4	

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

Description of the Event

At approximately 0215 hours on December 21, 1989, while making his routine rounds the Assistant Unit Operator (AUO) identified that the number of residual heat removal service water (RHRSW) [BI] pumps available was less than that required because of the loss of two redundant "B" series RHRSW sump pumps. Sump pump B2 was out of service because of modifications in progress to replace its level switch and other improvements. The AUO determined that the automatic-start feature of the redundant sump pump B1 failed causing the RHRSW pump room sumps to overfill, resulting in approximately three to four inches of water standing on the floor of the associated RHRSW pump room. The AUO immediately changed the control switch position of the RHRSW sump pump B1 from automatic to manual, which started the sump pump and returned the sump level to normal. The AUO subsequently notified the control room operator of the event.

The associated "B" series RHRSW pumps (three pumps) are considered to be "technically" inoperable without the support of their sump pumps. This left only one operable RHRSW pump aligned to the operable loop of residual heat removal (RHR)[B0], since the other RHRSW pumps of that RHR loop were out of service because of maintenance and modifications. Technical specification 3.5.C.7 requires that at least two RHRSW pumps, associated with the RHR pumps selected for operation, be aligned for RHR heat exchanger service for each reactor vessel containing irradiated fuel. This is a condition prohibited by technical specifications, which is reportable in accordance with 10 CFR 50.73(a)(2)(i)(B). Since the operator rounds were being conducted twice a shift, it is estimated that no more than four hours elapsed between the time that the switch failed and the time the AUO discovered the overfilled sump.

During this event, units 1 and 3 were defueled, and unit 2 was in cold shutdown with fuel in the reactor vessel and the head removed.

Cause of Event

The cause of the event was the failure of the level switch associated with RHRSW sump pump B1 to actuate on high sump water level. The water accumulation was due to normal inleakage into the RHRSW sump. This level switch was determined to be out of calibration. A review of the maintenance history of these level switches over the last 18 months indicates that numerous maintenance requests were written to correct various problems with these switches, such as calibration, pumps failing to auto-start/stop and continuous pump operation.

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		YEAR	NUMBER	NUMBER	NUMBER	NUMBER	NUMBER				
BROWNS FERRY UNIT 2	0500026089	0	2	9	0	0	0	3	0	4	

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

Analysis of Event

The RHRSW sump pumps are designed to remove the water that could accumulate in in the RHRSW pump room sumps as a result of the maximum probable rainfall or inleakage. One of the two sump pumps in each of the RHRSW pump rooms is required to support the operation of the associated RHRSW pumps. The technical specification requirement for the RHRSW supply to the RHR heat exchangers ensures the capability to cool the core.

Had this condition occurred under a different initial condition, such as full power, the ability of the RHRSW system to perform its intended safety function could have been jeopardized during a design basis accident, in conjunction with the single failure of the operable RHRSW pump. However, this event occurred without significant rainfall and with unit 2 in cold shutdown. Additionally, the water level in the pump room at the time the event was discovered would not have impaired the "B" series RHRSW pumps from performing their intended function. The lower rate of water accumulation due to normal inleakage and lower decay heat rate at cold shutdown present a less significant event from a safety standpoint.

Corrective Actions

Upon discovery of the overfilled sump, the AUO immediately started sump pump B1 manually and returned the sump level to normal. A maintenance request to calibrate the level switch was initiated at 0300 hours on December 21, 1989. The B1 RHRSW sump pump and associated RHRSW pumps were returned to an operable condition at 0600 hours on December 22, 1989.

A preventive maintenance program was established in January 1989, as a result of the equipment failure and trending program, to calibrate and check the operability of the level switches at least once every six months. A review of the maintenance history of these level switches over the last 18 months indicates that numerous maintenance requests were written to correct various problems with these switches, such as calibration, pumps failing to auto-start/stop and continuous pump operation.

A design change notice had been issued prior to this event to replace the level switches for each RHRSW sump pump. During the event, the B2 sump pump was out of service for modifications to replace the level switch and other improvements.



LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

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BROWNS FERRY UNIT 2	0500026089--	0	2	9	--	0	0	04 OF 04

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

Previous Similar Events

LER 260/89011

LER 260/89027

Two previous similar events were identified that involved an insufficient number of operable RHRSW pumps to satisfy technical specifications because of a loss of a sump pump.

LER 260/89011 discusses an event that was attributed to system outages requiring certain RHRSW pumps to be out of service and the loss of the two redundant sump pumps, one because of maintenance and the other to a level switch level problem. The corrective action in that previous event was to return those RHRSW pumps, not associated with the inoperable sump pump, to an operable condition. The sump pump and associated RHRSW pumps were later returned to service. The cause of that previous event is identical to this event. Although the design change to replace the unreliable level switches was already written, the previous LER made no mention of this corrective action.

LER 260/89027 discusses an event that was attributed to the lack of attention to detail by personnel performing modifications. During this event, an unsecured temporary power cable fell into the sump and became lodged in the pump impeller. Modification personnel were required to review the incident report. The cause of that event is not directly applicable to this event.

Commitments

The level switches in each RHRSW sump pump will be replaced prior to unit 2 restart.

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