

# ACCELERATED DISTRIBUTION DEMONSTRATION SYSTEM

## REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 8901270386      DOC. DATE: 89/01/20      NOTARIZED: NO      DOCKET #  
 FACIL: 50-296 Browns Ferry Nuclear Power Station, Unit 3, Tennessee      05000296  
 AUTH. NAME      AUTHOR AFFILIATION  
 WILLARD, S.C.      Tennessee Valley Authority  
 RECIP. NAME      RECIPIENT AFFILIATION

SUBJECT: LER 88-008-00: on 881221, unplanned ESF actuations. Caused by erratic voltage regulation due to lack of maint.

W/8      ltr.

DISTRIBUTION CODE: IE22D      COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 5  
 TITLE: 50.73 Licensee Event Report (LER), Incident Rpt, etc.

NOTES: 1 Copy each to: S. Black, J.G. Partlow, S. Richardson      05000296  
          B.D. Liaw, F. McCoy.

	RECIPIENT ID CODE/NAME	COPIES LTTR ENCL	RECIPIENT ID CODE/NAME	COPIES LTTR ENCL	
	SIMMS, M	1 1	PD	1 1	
	GEARS, G	1 1			
INTERNAL:	ACRS MICHELSON	1 1	ACRS MOELLER	2 2	
	ACRS WYLIE	1 1	AEOD/DOA	1 1	
	AEOD/DSP/TPAB	1 1	AEOD/ROAB/DSP	2 2	
	ARM/DCTS/DAB	1 1	DEDRO	1 1	
	NRR/DEST/ADE 8H	1 1	NRR/DEST/ADS 7E	1 0	
	NRR/DEST/CEB 8H	1 1	NRR/DEST/ESB 8D	1 1	
	NRR/DEST/ICSB 7	1 1	NRR/DEST/MEB 9H	1 1	
	NRR/DEST/MTB 9H	1 1	NRR/DEST/PSB 8D	1 1	
	NRR/DEST/RSB 8E	1 1	NRR/DEST/SGB 8D	1 1	
	NRR/DLPQ/HFB 10	1 1	NRR/DLPQ/QAB 10	1 1	
	NRR/DOEA/EAB 11	1 1	NRR/DREP/RAB 10	1 1	
	NRR/DREP/RPB 10	2 2	NRR/DRIS/SIB 9A	1 1	
	NUDOCS-ABSTRACT	1 1	<del>REG FILE</del> 02	1 1	
	RES/DSIR/EIB	1 1	RES/DSR/PRAB	1 1	
	RGN2 FILE 01	1 1			
EXTERNAL:	EG&G WILLIAMS, S	4 4	FORD BLDG HOY, A	1 1	
	H ST LOBBY WARD	1 1	LPDR	1 1	
	NRC PDR	1 1	NSIC HARRIS, J	1 1	
	NSIC MAYS, G	1 1			

NOTES:      5      5

NOTE TO ALL "RIDS" RECIPIENTS:

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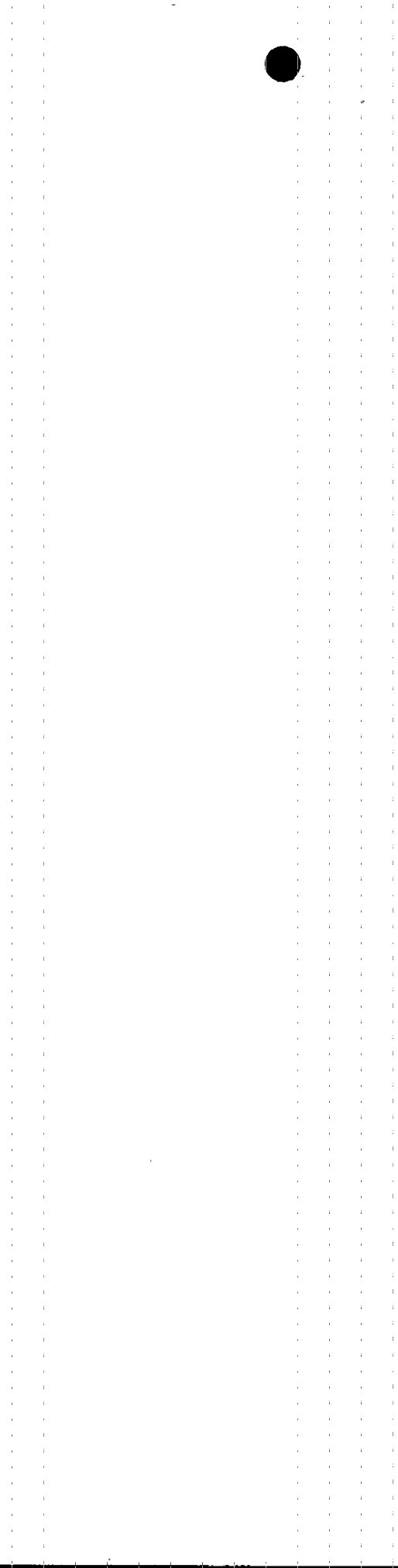
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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) <b>BROWNS FERRY UNIT 3</b>	DOCKET NUMBER (2) <b>0   5   0   0   0   2   1   9   6</b>	PAGE (3) <b>1   OF   0   4</b>
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TITLE (4) **UNPLANNED ENGINEERED SAFETY FEATURE ACTUATIONS CAUSED BY ERRATIC VOLTAGE REGULATION DUE TO LACK OF PREVENTIVE MAINTENANCE**

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)		
MONTH	DAY	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	YEAR	MONTH	DAY	YEAR	FACILITY NAMES		DOCKET NUMBER(S)
1	2	8	0	0	8	0	1	8	BROWNS FERRY UNIT 1		0   5   0   0   0   2   5   1   9
1	2	8	0	0	8	0	1	8	BROWNS FERRY UNIT 2		0   5   0   0   0   2   6   1   0

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

OPERATING MODE (9): <b>N</b>	<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.405(c)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 73.71(b)
POWER LEVEL (10): <b>0   0   0</b>	<input type="checkbox"/> 20.405(a)(1)(i)	<input type="checkbox"/> 50.36(c)(1)	<input 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 type="checkbox"/> 50.73(a)(2)(vi)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
	<input type="checkbox"/> 20.405(a)(1)(iii)	<input type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 50.73(a)(2)(vii)(A)	
	<input type="checkbox"/> 20.405(a)(1)(iv)	<input type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(vii)(B)	
	<input type="checkbox"/> 20.405(a)(1)(v)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
<b>Stephen C. Willard, Engineer, Plant Reporting Section</b>	<b>2   1   0   1   5   7   1   2   1   9   1   -   1   2   1   5   1   3   1   6</b>

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
E	J C	1910	0101216	No					

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE)  NO

EXPECTED SUBMISSION DATE (15)

MONTH	DAY	YEAR

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

On December 21, 1988, at 2005 hours, the unit 3 3B1 and 3B2 Reactor Protection System (RPS) circuit protector tripped deenergizing the 3B RPS bus and completing the initiation logic for engineered safety features (ESF), including a half scram, primary and secondary containment isolations, Standby Gas Treatment and Control Room Emergency Ventilation.

After switching to the alternate supply the unit operator reset the isolations and returned the systems to standby readiness by 2022 hours.

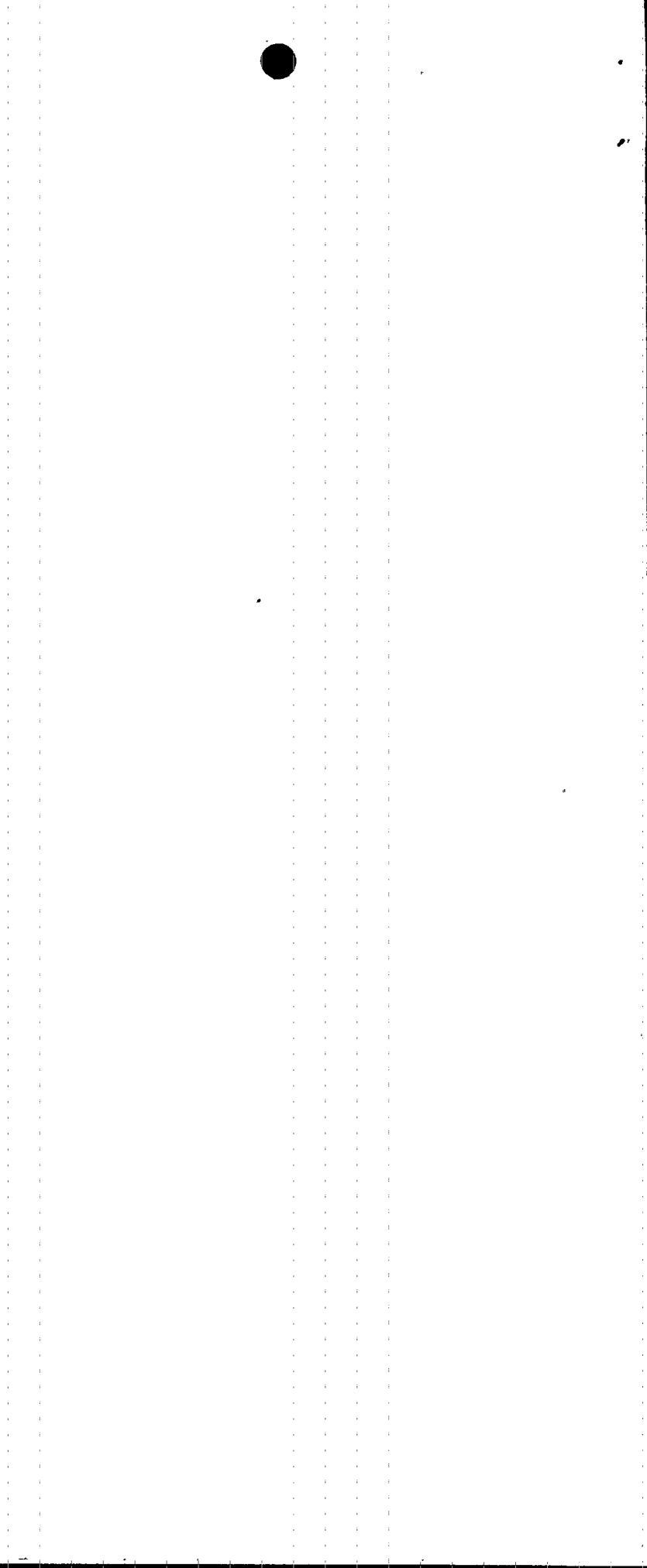
The circuit protectors tripped as designed because of brief voltage fluctuations in the output of the 3B RPS MG set which were caused by pitting on the contact surfaces of the voltage adjustment potentiometer in the MG set voltage regulation circuit.

Preventive maintenance (PM) practices in the past did not specifically address cleaning the voltage adjustment potentiometer and did not incorporate the vendor recommended discontinuity check.

The procedures covering this potentiometer and similar potentiometers will be reviewed and revised as necessary to include cleaning and discontinuity checks.

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PDR ADDCK 05000296  
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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)  BROWNS FERRY UNIT 3	DOCKET NUMBER (2)  0   5   0   0   0   2   9   6   8   8	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		—	0   0   8	—	0   0	0   2 OF 0   4

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

Description of Event

Browns Ferry units 1, 2, and 3 were defueled during this event and no fuel handling was in progress. Unit 3 and common ventilation systems were involved.

On December 21, 1988 at 2005 hours the 3B1 and 3B2 Reactor Protection System (RPS) (EIIS code JC) circuit protector tripped deenergizing the 3B RPS bus and completing the initiation logic for the following engineered safety features (ESF).

1. Unit 3 RPS half scram, channel B
2. Containment Isolations/Actuations (EIIS code JM)

- Unit 3

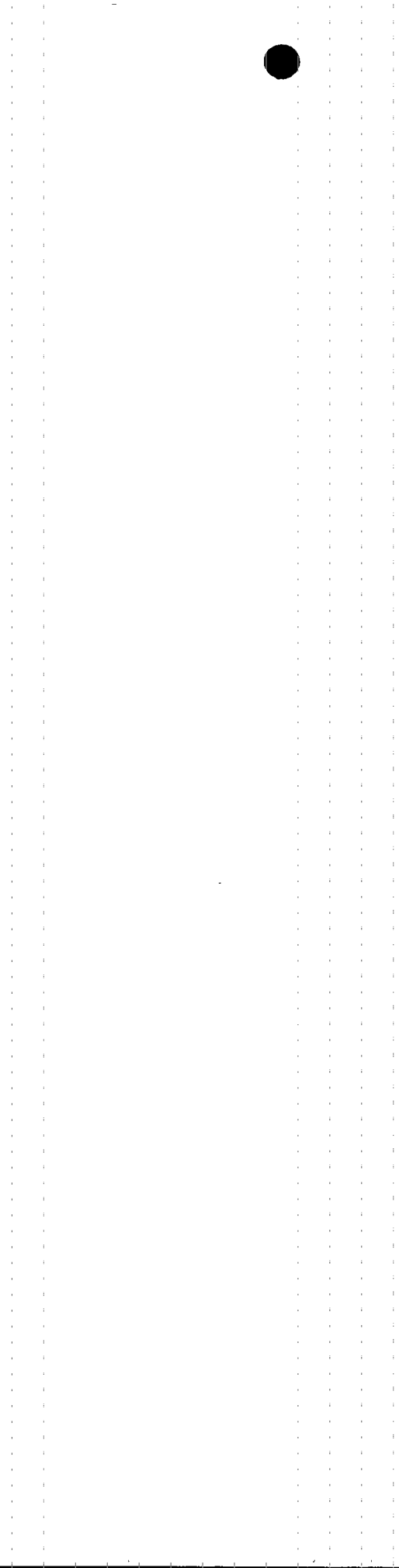
- Group 2 (Residual Heat Removal) isolation, outboard valves (EIIS code B0)
- Group 3 (Reactor Water Cleanup) isolation, outboard valves (EIIS code CE)
- Group 6 (purging and venting) isolation, outboard valves (EIIS code VB)
- Group 8 (Traversing Incore Probe) isolation (EIIS code IG)
- Reactor zone isolation (EIIS code VA)

- Common

- Standby Gas Treatment trains A, B, and C (EIIS code BH)
- Control Room Emergency Ventilation (CREV), trains A and B (EIIS code VI)
- Units 1, 2, and 3 refuel zone isolations (EIIS code VG)

Groups 3 and 8 were previously removed from service and CREV was already running as part of a surveillance; therefore, these systems did not actuate upon loss of RPS power. The remainder of the systems listed above actuated as designed.

The unit operator acknowledged the alarms and verified the actuations. Another operator went to Battery Board Room 3 and reset circuit protector 3B1 and attempted to reset 3B2 but was unable. The operator then adjusted the voltage regulator for the 3B RPS MG set (cycled the voltage down, up, and back to normal) and was then able to reset the 3B2 circuit protector. The Shift Operations Supervisor directed that the 3B RPS bus be switched to the alternate supply and a troubleshooting maintenance request be written on the 3B RPS power supply. After switching to the alternate supply the unit operator reset the isolations and returned the systems to standby readiness by 2022 hours.



LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)  BROWNS FERRY UNIT 3	DOCKET NUMBER (2)  0   5   0   0   0   2   9   6	LER NUMBER (6)			PAGE (3)		
		YEAR 8   8	SEQUENTIAL NUMBER -   0   0   8	REVISION NUMBER -   0   0			

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

Cause of Event

The ESF actuations occurred when the 3B1 and 3B2 circuit protectors tripped and deenergized the 3B RPS bus. The circuit protectors tripped as designed because of brief voltage fluctuations in the output of the 3B RPS MG set which were caused by pitting on the contact surfaces of the voltage adjustment potentiometer in the MG set voltage regulation circuit. The pitting was caused by arcing across the contact surfaces. Dirt and other contamination on the surfaces allowed the arcing and the constant use at one position allowed that arcing to deteriorate the surfaces to the point of causing erratic voltage regulation.

Preventive maintenance (PM) practices in the past did not specifically address cleaning the voltage adjustment potentiometer and did not incorporate the vendor recommended discontinuity check.

The voltage adjustment potentiometer is manufactured by Ohmite Manufacturing Company; model #H-0156.

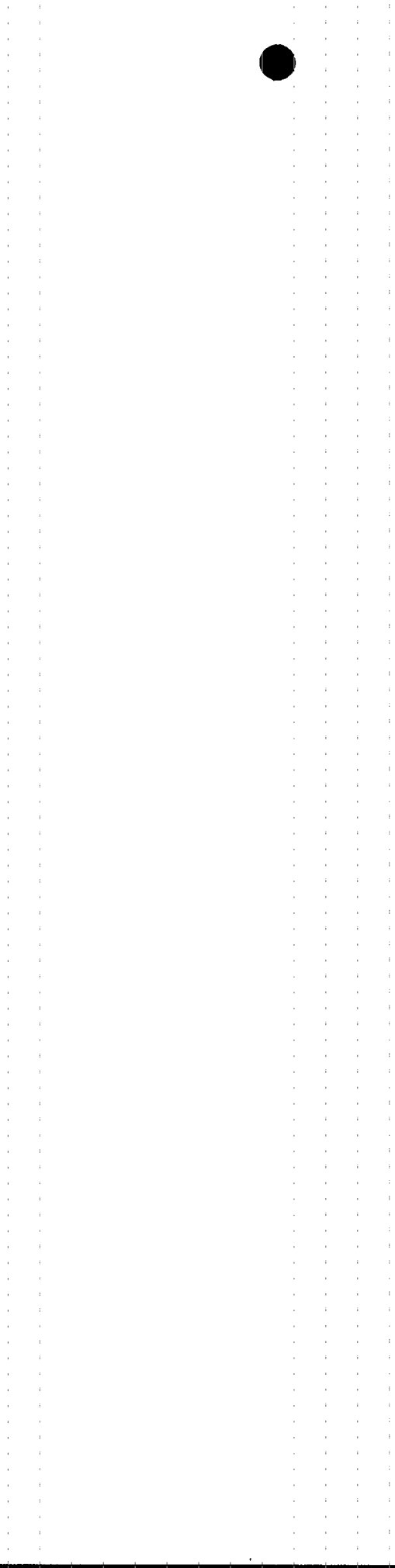
Corrective Action

The 3B1 and 3B2 circuit protectors were reset. The 3B RPS bus was put on the alternate supply and the isolations were reset and the systems were returned to standby readiness. A troubleshooting investigation was initiated which checked the performance of the MG set and the circuit protectors and initially found no problems. Continuous monitoring and recording equipment was installed. Short duration voltage fluctuations were detected with an erratic frequency of occurrence. The MG set voltage regulation circuit was again checked and the degraded voltage adjustment potentiometer was identified. The potentiometer was replaced and the monitoring continued to verify MG set performance.

The preventive maintenance program in general has undergone extensive improvements during the past 2 years. The PM procedure covering the potentiometer had been recently revised to include cleaning the potentiometer but did not include the discontinuity check. The procedures covering this potentiometer and similar potentiometers will be reviewed and revised as necessary to include cleaning and discontinuity checks. The potentiometers in the other RPS MG sets and similar potentiometers will be inspected for cleanliness, degradation, and discontinuities.

Analysis of Event

The systems affected are designed to shutdown the reactor or contain and process any radioactive releases. The systems are designed to fulfill their safety functions upon loss of initiation logic power. The systems responded correctly to the loss of power, therefore, plant safety was not adversely affected. The plant's safe shutdown capabilities would not have





LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)  BROWNS FERRY UNIT 3	DOCKET NUMBER (2)  0   5   0   0   0   2   9   6	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
		8   8	-   0   0   8	-   0   0	0   4	OF	0   4

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

Analysis of Event (continued)

been diminished had the unit been at power. With the units defueled and no fuel handling in progress there was little affect on unit operation.

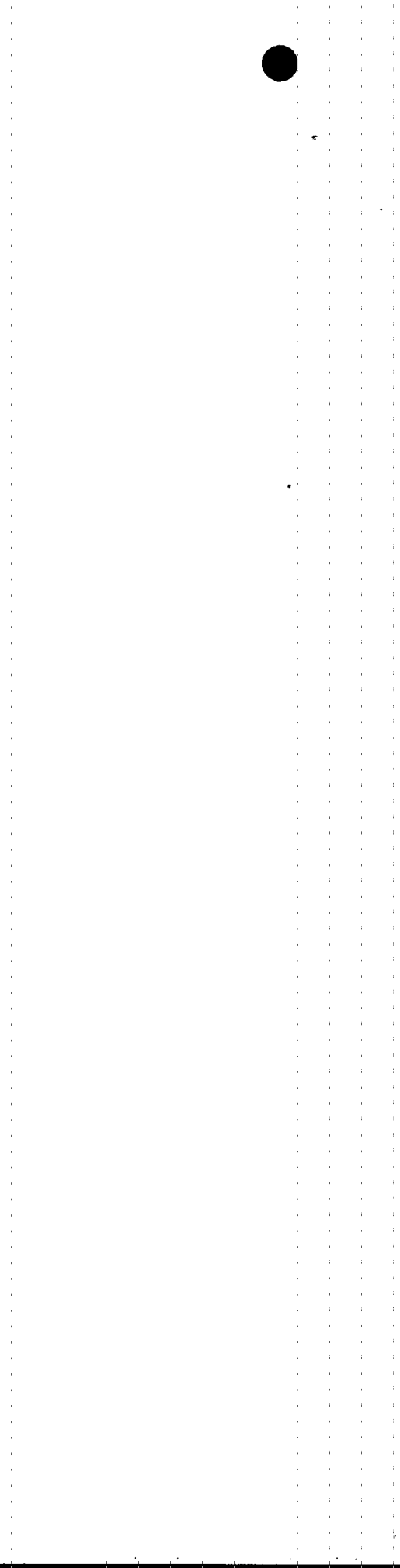
Previous Similar Events - 259/86002 R1      260/88002  
                                  259/86031 R1      260/88006 R1  
                                  259/87003  
                                  259/87015  
                                  259/87018  
                                  259/88018  
                                  259/88044

These LERs addressed circuit protector trips and subsequent ESF actuations, however, no previous events were attributed to the potentiometer degradation.

Commitments

The procedures covering this potentiometer and similar potentiometers will be reviewed and revised as necessary to include cleaning and discontinuity checks by June 1, 1989.

The potentiometers in the other RPS MG sets and similar potentiometers will be inspected for cleanliness, degradation, and discontinuities by June 1, 1989.



TENNESSEE VALLEY AUTHORITY

Browns Ferry Nuclear Plant  
Post Office Box 2000  
Decatur, Alabama 35602

JAN 20 1989

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

Dear Sir:

TENNESSEE VALLEY AUTHORITY - BROWNS FERRY NUCLEAR PLANT UNIT 3 - DOCKET  
NO. 50-296 - FACILITY OPERATING LICENSE DPR-68 - REPORTABLE OCCURENCE REPORT  
BFRO-50-296/88008

The enclosed report provides details concerning the unplanned engineered safety feature actuations caused by erratic voltage regulation due to lack of preventive maintenance. This report is submitted in accordance with 10 CFR 50.73 (a)(2)(iv).

Very truly yours,

TENNESSEE VALLEY AUTHORITY



Guy G. Campbell  
Plant Manager  
Browns Ferry Nuclear Plant

Enclosures

cc (Enclosures):

Regional Administration  
U.S. Nuclear Regulatory Commission  
Office of Inspection and Enforcement  
Region II  
101 Marietta Street, Suite 2900  
Atlanta, Georgia 30303

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

NRC Resident Inspector, Browns Ferry Nuclear Plant

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