

# ACCELERATED DISTRIBUTION DEMONSTRATION SYSTEM

## REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:9403160207 DOC.DATE: 94/03/10 NOTARIZED: NO  
 FACIL:50-270 Oconee Nuclear Station, Unit 2, Duke Power Co.  
 AUTH.NAME AUTHOR AFFILIATION  
 WILKIE,L.V. Duke Power Co.  
 HAMPTON,J.W. Duke Power Co.  
 RECIP.NAME RECIPIENT AFFILIATION

DOCKET #  
05000270

SUBJECT: LER 94-001-00:on 940208,discovered water leaking from 2A  
 motor driven emergency feedwater pump automatic initiation  
 pressure switch.Caused by equipment failure.Defective switch  
 replaced.W/940310 ltr.

DISTRIBUTION CODE: IE22T COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 6  
 TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

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	NRR/DE/EELB		1	1		NRR/DE/EMEB		1	1
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	REG FILE 02		1	1		RES/DSIR/EIB		1	1
	RGN2 FILE 01		1	1					
EXTERNAL:	EG&G BRYCE,J.H		2	2		L ST LOBBY WARD		1	1
	NRC PDR		1	1		NSIC MURPHY,G.A		1	1
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**DUKE POWER**

March 10, 1994

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

Subject: Oconee Nuclear Station  
Docket Nos. 50-269, -270, -287  
LER 270/94-01

Gentlemen:

Pursuant to 10 CFR 50.73 Sections (a)(1) and (d), attached is Licensee Event Report (LER) 270/94-01, concerning a Technical Specification limit which was exceeded due to equipment failure.

This report is being submitted in accordance with 10 CFR 50.73 (a)(2)(i)(B). This event is considered to be of no significance with respect to the health and safety of the public.

Very truly yours,

  
J. W. Hampton  
Vice President

/ftr

Attachment

xc: Mr. S. D. Ebnetter  
Regional Administrator, Region II  
U.S. Nuclear Regulatory Commission  
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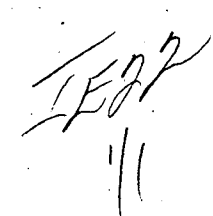
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U.S. Nuclear Regulatory Commission  
Washington, DC 20555

Mr. P. E. Harmon  
NRC Resident Inspector  
Oconee Nuclear Site

150030

9403160207 940310  
PDR ADOCK 05000270  
S PDR



## LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)

OCONEE NUCLEAR STATION, UNIT 2

DOCKET NUMBER (2)

05000 270

PAGE (3)

1 OF 5

TITLE (4)

## TECHNICAL SPECIFICATION LIMIT EXCEEDED DUE TO EQUIPMENT FAILURE

EVENT DATE (5)			LER NUMBER (6)			REPORT NUMBER (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
02	08	94	94	01	00	03	10	94	FACILITY NAME	DOCKET NUMBER
										05000
									FACILITY NAME	DOCKET NUMBER
										05000

OPERATING MODE (9)	POWER LEVEL (10)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)				
N	100	20.402(b)	20.405(a)(1)(i)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
		20.405(a)(1)(ii)	20.405(a)(1)(iii)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
		20.405(a)(1)(iv)	20.405(a)(1)(v)	50.36(c)(2)	50.73(a)(2)(vii)	OTHER
			X 50.73(a)(2)(i) (B)		50.73(a)(2)(viii)(A)	(Specify in Abstract below and in Text, NRC Form 366A)
			50.73(a)(2)(ii)		50.73(a)(2)(viii)(B)	
			50.73(a)(2)(iii)		50.73(a)(2)(x)	

## LICENSEE CONTACT FOR THIS LER (12)

NAME

L. V. Wilkie, Safety Review Manager

TELEPHONE NUMBER (Include Area Code)

(803) 885-3518

## 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
F	BA	XIS	C753	Yes					

## SUPPLEMENTAL REPORT EXPECTED (14)

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

## ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On December 29, 1993, at 2100 hours, Operations personnel discovered water leaking from the 2A Motor Driven Emergency Feedwater Pump automatic initiation pressure switch (2PS0386). On December 30, 1993, the switch was replaced, an investigation was initiated, and an engineering evaluation into the past operability was requested. On February 8, 1994, with Unit 2 at 100% full power, the engineering evaluation determined that the 2A Motor Driven Emergency Feedwater Pump would not have automatically initiated on low Main Feedwater (MFDW) discharge pressure while the switch contacts were shorted by the water intrusion. A DC ground alarm had been received on December 14, 1993 but had not been located until the pressure switch was replaced on December 30, 1993. Problems with this model switch have been identified previously and replacements of a different design were in the process of being scheduled. The root cause of this event is equipment failure. Corrective actions include replacing the defective pressure switch and to replace other switches of this model, used for sensing MFDW discharge pressure, on all three Oconee Units.

**LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION**

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OCONEE NUCLEAR STATION, UNIT 2		05000 270		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 OF 5
				94	01	00	

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

**BACKGROUND**

The Emergency Feedwater (EFDW) system [EIIS:BA] is designed to start automatically upon loss of Main Feedwater (MFDW) [EIIS:SJ] or low level in either Steam Generator (SG). The EFDW system consists of two motor driven pumps and one turbine driven pump. The Motor Driven Emergency Feedwater Pumps (MDEFDWP) have initiation circuitry which will start the pumps automatically when both Main Feedwater Pumps (MFDWP) have low hydraulic oil pressure or both MFDWP's have low discharge pressure. Also, an initiation signal is generated on low SG level. An additional system that is designed to actuate when MFDW is lost is the ATWS Mitigation Safety Actuation Circuit (AMSAC). The AMSAC system will initiate EFDW in the same way as the normal EFDW system and trip the main turbine [EIIS:TA]. The AMSAC system is intended to mitigate the consequences of an anticipated transient without scram event.

The MDEFDWP's start circuitry is provided by 125V DC supplied from the Vital Battery [EIIS:EJ] system. The MDEFDWP's are started by two automatic logic conditions. Automatic initiation logic 1 (Auto 1) starts the pumps with a low SG level in either of the two SG's. Automatic initiation logic 2 (Auto 2) starts the pumps with low SG level in either SG or low discharge pressure on both MFDWP's or low control oil pressure on both MFDWP's. MFDWP discharge pressure switch (2PS0386) monitors MFDWP 2A discharge pressure and is used to start the 2A MDEFDWP in a coincident logic arrangement as described previously.

Technical Specification (TS) 3.4 addresses the EFDW system and the bases which require automatic EFDW initiation circuitry. The TS allows one MDEFDWP to be inoperable for a period of up to seven days.

**EVENT DESCRIPTION**

On December 14, 1993, with Unit 2 at 100% full power, a DC ground alarm was received in the Unit 2 control room. A work request was initiated to investigate the control battery ground detection system. The investigation continued from December 14, 1993 through December 29, 1993.

On December 29, 1993, with Unit 2 at 100% full power, Operations personnel identified water leaking from the 2A Main Feedwater Pump (MFDWP) discharge pressure switch (PS) associated with the automatic start circuitry for the 2A Motor Driven Emergency Feedwater Pump (MDEFDWP). A work request was issued to Instrument and Electrical (I&E) personnel for the investigation and repair of the leak. Also, a seven day Limiting Condition for Operation was entered per Technical Specification 3.4.2.a. because the automatic initiation circuit was out of service. When the PS electrical leads were

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removed for repair/replacement, the DC ground alarm cleared. Operations and I&E personnel then realized that the PS was causing the ground. It was noted that the pressure switch was full of water. The PS was replaced with the same model spare and the LCO was exited on December 30, 1993.

Engineering initiated an assessment of the problem to determine the past operability of the 2A MDEFDWP. This assessment included a review of the start logic circuitry, the DC battery system ground fault detection circuitry, and the failed PS. The relationship between the 125V DC battery configuration and the point in the 2A MDEFDWP start logic where the ground occurred was examined.

On February 8, 1993 the assessment was completed and it was concluded that the 2A MDEFDWP would have started as required, for other initiation signals, but would not have started for a loss of MFDWP discharge pressure. This condition did not fully meet the TS requirement for automatic initiation. This condition existed from December 14, 1993 until December 30, 1993, therefore, the seven day TS Limiting Condition for Operation was exceeded.

**CONCLUSIONS**

The root cause of this event is equipment failure. The cause of the pressure switch (PS) failures has been attributed to the polyamide diaphragm in the switch becoming permeable, over time, in applications for sensing Main Feedwater discharge pressure. This allows water intrusion and will short the contacts within the switch. This model PS had exhibited similar failures in the past, however, there were no DC grounds identified as occurring. The DC ground that occurred on December 14, 1993 was a result of the switch failure. After the electrical connections to the switch were removed, the ground was determined to be related to the switch failure. The PS was determined to be inoperable as a result of the water intrusion.

A review of previous events for the last two years, revealed that no other reportable events associated with the PS's have been identified. However, there have been problems associated with this model PS in FDW applications identified in the Problem Investigation Process (PIP) reports. PIP numbers 2-092-0229 and 2-092-0534 identified the same water leakage problems with this model switch. The planned corrective action was to replace all switches used to detect loss of MFDW discharge pressure with an improved replacement during the next scheduled refueling outage for each unit. The replacement switch required seismic and environmental testing and a completed test report before the manufacturer could begin shipment. The Unit 3 PS's have been replaced and Unit 1 and 2 are scheduled for the next

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refueling outages. It is concluded that the scope and schedule for these planned corrective actions were reasonable. However, the corrective measures could not be accomplished before the circumstances surrounding this event occurred.

This event is not considered recurring, however, the failure of the equipment is recurring. The previous switch failures were identified during Technical Specification Surveillance testing and the repairs were made without exceeding Technical Specification limits.

The PS identified in this event is NPRDS reportable. The manufacture is Custom Control Sensors model number 604GZ5.

There were no personnel injuries, radiation exposures, or releases of radioactive materials associated with this event.

**CORRECTIVE ACTIONS****Immediate**

1. The 2A Motor Driven Emergency Feedwater Pump pressure switch was isolated and a Limiting Condition for Operation (LCO) was entered.

**Subsequent**

1. The pressure switch was replaced with the same model, the LCO was exited, and an investigation was initiated to determine the cause of the problem.

**Planned**

1. Identify all pressure switches of this model used in the sensing of Main Feedwater Pump discharge pressure applications and inspect for water intrusion on a weekly basis until replaced.
2. Replace the pressure switches as identified in Planned Corrective Action number 1 with a replacement that will not exhibit the failures as described in this report.
3. Evaluate other plant applications of this model number pressure switch to ensure that critical applications of this switch are not exhibiting adverse trends and take appropriate action.

**LICENSEE EVENT REPORT (LER)  
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**SAFETY ANALYSIS**

Although a portion of the automatic initiation circuit for the 2A Motor Driven Emergency Feedwater Pump (MDEFDWP) was not operable from December 14 through 30, 1993, other means for the 2A pump actuation were available.

The 2A MDEFDWP could have automatically initiated on low Main Feedwater Pumps hydraulic oil pressure or on low Steam Generator Level (Dry Out Protection). Also, the Final Safety Analysis Report Chapter 10 credits the start of the Emergency Feedwater (EFDW) system on the loss of Main Feedwater (MFDW) with no distinction between a low discharge pressure and low hydraulic oil pressure. Therefore, since the pressure switch for low hydraulic oil pressure was operable there was no safety significance associated with the EFDW system.

The ATWAS Mitigation Safety Actuation Circuit (AMSAC) could have automatically initiated the EFDW system, including the 2A MDEFDWP, since this is separate circuitry. During a loss of MFDW event, the Operators are directed by the Emergency Operating Procedure (EOP) and Abnormal Procedures (AP) to verify that all Emergency Feedwater Pumps (EFDWP) have started. The operators could have started the 2A MDEFDWP manually from the Unit 2 control room.

The 2B MDEFDWP and the Turbine Driven Emergency Feedwater Pump were not affected and would have the capability to automatically start on low MFDWP discharge pressures.

In the event that none of the EFDWP's would start, the EOP and APs direct the Operators to align EFDW from one of the other two Oconee units.

If all of these efforts failed, the EOP and AP's provide for use of High Pressure Injection [EIIS:BG] forced cooling and/or use of the Standby Shutdown Facility Auxiliary Service Water Pump [EIIS:BA]. Analyses have been performed to verify that sufficient time is available for an operator to line up these systems before any core damage would occur.

Therefore, sufficient redundancy exists to assure that, even with the Main Feedwater discharge pressure automatic start portion of the 2A MDEFDWP unavailable, the health and safety of the public was not compromised by this event.