

# ACCELERATED DISTRIBUTION DEMONSTRATION SYSTEM

## REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:8808250078 DOC.DATE: 88/08/17 NOTARIZED: NO DOCKET #  
 FACIL:50-331 Duane Arnold Energy Center, Iowa Electric Light & Pow 05000331  
 AUTH.NAME AUTHOR AFFILIATION  
 PUTNAM,K.S. Iowa Electric Light & Power Co.  
 HANNEN,R.L. Iowa Electric Light & Power Co.  
 RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 88-008-00:on 880724,vibration transmitter failure  
 results in turbine trip & reactor scram.

W/8 ltr.

DISTRIBUTION CODE: IE22D COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 4  
 TITLE: 50.73 Licensee Event Report (LER), Incident Rpt, etc.

### NOTES:

	RECIPIENT ID CODE/NAME	COPIES LTTR ENCL	RECIPIENT ID CODE/NAME	COPIES LTTR ENCL
	PD3-3 LA	1 1	PD3-3 PD	1 1
	HALL,J.R.	1 1		
INTERNAL:	ACRS MICHELSON	1 1	ACRS MOELLER	2 2
	ACRS WYLIE	1 1	AEOD/DOA	1 1
	AEOD/DSP/NAS	1 1	AEOD/DSP/ROAB	2 2
	AEOD/DSP/TPAB	1 1	ARM/DCTS/DAB	1 1
	DEDRO	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	REG FILE 02	1 1
	RES TELFORD,J	1 1	RES/DSIR DEPY	1 1
	RES/DSIR/EIB	1 1	RGN3 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
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## LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)  
Duane Arnold Energy Center (DAEC)DOCKET NUMBER (2)  
0 5 0 0 0 3 3 1 1 OF 0 3

PAGE (3)

TITLE (4)

Vibration Transmitter Failure Results in Turbine Trip and Reactor Scram

EVENT DATE (5)  
MONTH DAY YEAR  
0 7 2 4 8 8 8 8  
LER NUMBER (6)  
YEAR SEQUENTIAL NUMBER REVISION NUMBER  
0 0 8 0 0  
REPORT DATE (7)  
MONTH DAY YEAR  
0 8 1 7 8 8  
OTHER FACILITIES INVOLVED (8)  
FACILITY NAMES  
None  
DOCKET NUMBER(S)  
0 5 0 0 0OPERATING MODE (9) N  
POWER LEVEL (10) 0 8 1  
THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §. (Check one or more of the following) (11)  
20.402(b) X  
20.405(a)(1)(i)  
20.405(a)(1)(ii)  
20.405(a)(1)(iii)  
20.405(a)(1)(iv)  
20.405(a)(1)(v)  
20.405(c)  
50.35(c)(1)  
50.35(c)(2)  
50.73(a)(2)(i)  
50.73(a)(2)(ii)  
50.73(a)(2)(iii)  
50.73(a)(2)(iv)  
50.73(a)(2)(v)  
50.73(a)(2)(vi)  
50.73(a)(2)(vii)  
50.73(a)(2)(viii)(A)  
50.73(a)(2)(viii)(B)  
50.73(a)(2)(ix)  
73.71(b)  
73.71(c)  
OTHER (Specify in Abstract below and in Text, NRC Form 365A)

## LICENSEE CONTACT FOR THIS LER (12)

NAME  
Kenneth S. Putnam, Technical Support Engineer  
TELEPHONE NUMBER  
AREA CODE  
3 1 1 9 8 5 1 1 - 1 7 6 1 0 1 0

## COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC
B	I T	V T	G 0 8 4	Yes					

## SUPPLEMENTAL REPORT EXPECTED (14)

X YES (If yes, complete EXPECTED SUBMISSION DATE)  
NO  
EXPECTED SUBMISSION DATE (15)  
MONTH DAY YEAR  
0 9 3 1 0 8 8

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

On July 24, 1988 at 1608 hours the reactor was operating at 81% power when a reactor scram occurred when a high vibration indication was received for the number ten journal bearing of the Main Turbine-Generator. Per design the turbine tripped, initiating a rapid closure of the Main Steam Turbine Stop Valves. Stop valve closure indication initiated the reactor scram. All safety systems responded properly and reactor pressure was controlled via Main Steam Bypass Valves to the condenser. Investigation of the cause of the high vibration condition led to the determination that the vibration transmitter for the number ten journal bearing had failed resulting in erroneous indication. The vibration transmitter was replaced and the plant successfully returned to power operation on July 27, 1988. The root cause of the transmitter failure is under investigation.

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## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

APPROVED OMB NO. 3150-0104

EXPIRES: 8/31/88

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
Duane Arnold Energy Center (DAEC)	05000331	88	008	00	02	OF	03

TEXT (If more space is required, use additional NRC Form 388A's) (17)

## I. DESCRIPTION OF EVENT:

On July 24, 1988 at 1608 hours with the reactor at 81% power, a reactor scram occurred due to a Main Turbine-Generator trip caused by an indication of high vibrations sensed at the number ten journal bearing (EIIS System Code IT). As designed, this resulted in energizing the turbine master trip bus and fast closure of the main stop valves followed by rapid closure of the turbine control valves. A reactor scram was generated by the stop valve closure signal. All systems responded per design. All control rods (EIIS System Code AA) were fully inserted, the Recirculation Pumps (EIIS System Code AD) tripped and the Non-essential Loads (EIIS System Code EA) transferred to off-site power. Main Steam Bypass Valves (EIIS System Code JI) opened and controlled reactor pressure. Peak reactor pressure was between 1110 and 1117 PSIG and was momentarily reached seconds into the event. No safety relief valves opened as the lowest relief valve setpoint is 1110 PSIG +/- 11 PSIG. As a result of the reactor scram and reactor pressure increase, reactor level momentarily decreased as expected to approximately 166 inches above the Top of Active Fuel. This initiated a Primary Containment Isolation (EIIS System Code JM) of Groups' 2-5 valves, isolated secondary containment, and started both trains of Standby Gas Treatment (EIIS System Code BH) as expected. Normal feedwater flow restored level promptly with no initiation of Emergency Core Cooling Systems. Reactor pressure and reactor level were restored to normal within 30 seconds after the turbine trip.

## II. CAUSE OF EVENT:

The cause of the event was a failure of the vibration transmitter for the number ten journal bearing resulting in a false high vibration indication. Inspection of the transmitter noted that minor tapping on the side of the transducer unit of the transmitter yielded a sporadic open coil (minimum output) condition. Inspection of the internals of the transducer found no obvious indications of degradation such as loose or bare wires which would result in the noted symptoms. The unit has been sent to the vendor for a detailed failure report. The results of the vendor inspection will be reported in a supplement to this Licensee Event Report. The vibration transmitter had periodically been experiencing higher than normal vibration indications during recent operation (varying between 4 and 7 mils).

The vibration transmitter probe tip normally rides on the surface of the rotating main shaft and communicates radial motion to the transducer. The transducer converts the motion to an electrical signal proportional to the magnitude of the motion. A probe tip modification was suggested by the vendor to ensure that a thick film of oil was not building up under the probe tip as the oiled shaft rotates. The vendor has indicated that the buildup of this oil layer could cause excessive service to the vibration monitor and erroneous vibration readings.

## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

APPROVED OMB NO. 3150-0104

EXPIRES: 8/31/88

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
Duane Arnold Energy Center (DAEC)	0 5 0 0 0 3 3 1	8 8	— 0 0 8	— 0 0	0 3	OF	0 3

TEXT (If more space is required, use additional NRC Form 388A's) (17)

## III. ANALYSIS OF EVENT:

As noted in Section I, all systems responded to the event per design. Operators responded to the event properly. The plant was promptly restored to a stable condition with no significant problems encountered. Turbine trips are expected plant transients provided for in plant design. Plant response would have been similar under other initial plant conditions. At higher power levels it is likely that a higher peak pressure would have been reached, a relief valve would have lifted, and wider pressure and level fluctuations would have resulted. A turbine trip from any licensed power level is an analyzed event.

## IV. CORRECTIVE ACTIONS:

The entire vibration monitoring unit was replaced on July 25, 1988. The probe tip on the replacement monitoring unit was modified in accordance with the vendor recommendation. Vibration indications were closely monitored during turbine startup on July 27, 1988, with no unusual vibration readings detected. The results of the vendor root cause determination will be reviewed and supplemental corrective actions considered at that time.

## V. ADDITIONAL INFORMATION:

## a. Failed Component Identification

The failed component was a transducer on a vibration transmitter supplied by the General Electric Company (G084) (EIIS Component Identifier IT-VT-1218K).

## b. Previous Similar Events

Plant records indicate there have been two previous instances of turbine trips from high vibration resulting in reactor scrams (October 14, 1977 and October 25, 1983 both events precede current LER reporting requirements). Both of these previous events were as a result of valid high vibration conditions and were not the result of vibration monitoring equipment failure.

## Iowa Electric Light and Power Company

August 17, 1988  
DAEC-88-0631

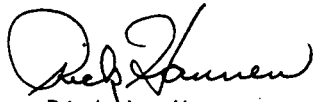
Mr. A. Bert Davis  
Regional Administrator  
Region III  
U. S. Nuclear Regulatory Commission  
799 Glen Ellyn, IL 60137

Subject: Duane Arnold Energy Center  
Docket No: 50-331  
Op. License DPR-49  
Licensee Event Report #88-008

Gentlemen:

In accordance with 10 CFR 50.73 please find attached a copy of the subject  
Licensee Event Report.

Very truly yours,

 8-17-88

Rick L. Hannen  
Plant Superintendent - Nuclear

RLH/KSP/go

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

NRC Resident Inspector - DAEC

File A-118a

AUG 19 1988