

50-331

## NRC DISTRIBUTION FOR PART 50 DOCKET MATERIAL

FILE NUMBER

INCIDENT REPORT

TO:

Mr. James G. Keppler

FROM:

Iowa Electric Light & Power Co.  
Cedar Rapids, Iowa  
Ellery L. Hammond

DATE OF DOCUMENT

2/25/77

DATE RECEIVED

3/8/77

☒ LETTER☐ NOTORIZED

PROP

INPUT FORM

NUMBER OF COPIES RECEIVED

☐ ORIGINAL☒ UNCLASSIFIED☒ COPY

One signed copy

DESCRIPTION

Ltr. trans the following:

PLANT NAME:

(1-P)

Duane Arnold

ENCLOSURE

Licensee Event Report (RO 50-331/77-9) on  
2/11/77 concerning the "A" core spray system  
inadvertently initiating when electrical  
maintenance personnel removed temporary test  
jumpers.....ACKNOWLEDGED  
DO NOT REMOVE

(3-P)

NOTE: IF PERSONNEL EXPOSURE IS INVOLVED  
SEND DIRECTLY TO KREGER/J. COLLINS

FOR ACTION/INFORMATION 3/8/77

RJL

☒ BRANCH CHIEF: Laera  
☒ W/3 CYS FOR ACTION  
☒ LIC. ASST.: Parrish  
☒ W/ CYS  
☒ ACRS 16 CYS ~~HOLDING~~/SENT: *Car. B. (3/8/77)*

## INTERNAL DISTRIBUTION

☒ REG FILE  
☒ NRC PDR  
☒ I & E (2)  
☒ MIPC  
☒ SCHROEDER/IPPOLITO  
☒ HOUSTON  
☒ NOVAK/CHECK  
☒ GRIMES  
☒ CASE  
☒ BUTLER  
☒ HANAUER  
☒ TEDESCO/MACCARY  
☒ EISENHUT  
☒ BAER  
☒ SHAO  
☒ VOLLMER/BUNCH  
☒ KREGER/J. COLLINS

## EXTERNAL DISTRIBUTION

☒ LPDR: Cedar Rapids, Iowa  
☒ TIC:  
☒ NSic:

CONTROL NUMBER

2450

# IOWA ELECTRIC LIGHT AND POWER COMPANY

DUANE ARNOLD ENERGY CENTER

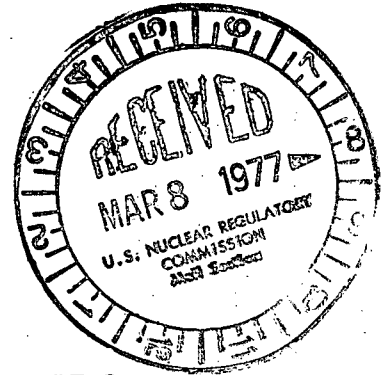
P. O. Box 351

Cedar Rapids, Iowa 52406

February 25, 1977

DAEC - 77 - 138

Mr. James G. Keppler, Director  
Office of Inspection and Enforcement  
U. S. Nuclear Regulatory Commission-Region III  
799 Roosevelt Road  
Glen Ellyn, Illinois 60137



Subject: Licensee Event Report No. 77-9  
(14 day)

File: A-118a

Dear Mr. Keppler:

In accordance with Appendix A to Operating License DPR-49, Technical Specifications and Bases for Duane Arnold Energy Center and Regulatory Guide 10.1, please find attached a copy of the subject Licensee Event Report. (Total of 3 copies transmitted)

Very truly yours,

*Ellery L. Hammond*

Ellery L. Hammond  
Chief Engineer  
Duane Arnold Energy Center

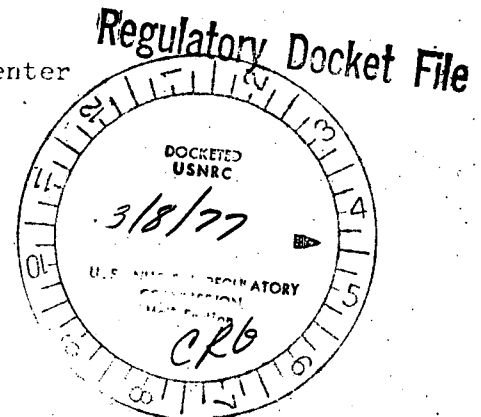
Docket 50-331

attachment

ELH/DLW/mg

cc: Director, Office of Inspection and Enforcement (40)  
U. S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Director, Management Information and Program Control (3)  
U. S. Nuclear Regulatory Commission  
Washington, D.C. 20555



2450

# LICENSEE EVENT REPORT

DAVE WILSON

CONTROL BLOCK: 1 6

[PLEASE PRINT ALL REQUIRED INFORMATION]

LICENSEE NAME 01 I A D A C 1														LICENSE NUMBER 0 0 - 0 0 0 0 0 - 0 0														LICENSE TYPE 4 1 1 1 1						EVENT TYPE 0 1					
CATEGORY 01 CONT														REPORT TYPE T		REPORT SOURCE L		DOCKET NUMBER 0 5 0 - 0 3 3 1										EVENT DATE 0 2 1 1 7 7						REPORT DATE 0 2 2 5 7 7					

## EVENT DESCRIPTION

02 During Surveillance Testing "A" Core Spray System inadvertently initiated.																																																																															
03 Due to discharge piping not being completely filled a water hammer caus																																																																															
04 ed stress which resulted in the clutch housing of MOV 2115 fracturing.																																																																															
05 "B" core spray system operable. Clutch housing fracture repetitive.																																																																															
06 housing replaced. System integrity analysed to be uneffected. (RO 77-9)																																																																															

SYSTEM CODE 07 S F				CAUSE CODE F		COMPONENT CODE V A L V E X											PRIME COMPONENT SUPPLIER N		COMPONENT MANUFACTURER L 2 0 0						VIOLATION N	
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## CAUSE DESCRIPTION

08 Unknown. Subsequent testing did not duplicate occurrence. Most probable																																																																															
09 cause of initiation was shorted contacts when jumpers were removed. Inve																																																																															
10 stigitation of water hammer continuing. More ductile clutch housing to be																																																																															

FACILITY STATUS 11 E				% POWER 0 8 5				OTHER STATUS NA												METHOD OF DISCOVERY B		DISCOVERY DESCRIPTION NA																	
FORM OF ACTIVITY RELEASED 12 Z				CONTENT OF RELEASE Z				AMOUNT OF ACTIVITY NA												LOCATION OF RELEASE NA																			

## PERSONNEL EXPOSURES

NUMBER 13 0 0 0				TYPE Z		DESCRIPTION NA											
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## PERSONNEL INJURIES

NUMBER 14 0 0 0				DESCRIPTION NA											
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## OFFSITE CONSEQUENCES

15 NA																																																																															
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## LOSS OR DAMAGE TO FACILITY

TYPE 16 Z				DESCRIPTION NA											
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## PUBLICITY

17 NA																																																																															
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## ADDITIONAL FACTORS

18 Cause Desc. Cont. - installed. System fill pump adequacy to be																																																																															
19 evaluated.																																																																															

NAME: D. Wilson

PHONE: 319-851-5611

DUANE ARNOLD ENERGY CENTER

Iowa Electric Light and Power Company

LICENSEE EVENT REPORT-Supplemental Data

Licensee Event Report Date: February 25, 1977

Reportable Occurrence No: 77-9

Description of Occurrence

During semiannual core spray system logic surveillance testing, the "A" core spray system inadvertently initiated when electrical maintenance personnel removed temporary test jumpers. Based on reports of loud noises from the system during initiation, a visual inspection of the core spray system "A" loop was initiated. The inspection revealed that the motor operator clutch housing on core spray injection valve MO 2115 had fractured. The damage apparently resulted from a water hammer that occurred during the system initiation.

Cause of Occurrence

The reason for the "A" core spray system initiation and the resultant water hammer could not be determined. The Surveillance Test Procedure was checked step by step and compared with system logic diagrams and no firm explanation for the initiation could be found. In addition, the Surveillance Test was repeated with detailed observation of each step and no problems were noted. Although no cause for the initiation could be determined, the most probable cause was accidental contact shorting during the final steps of the Surveillance Test when relay blocks and jumpers were being removed. Although the cause of the water hammer (drained discharge piping) could not be definitely determined, a contributing cause may have been leakage through MOV 2112, bypass test valve allowing the discharge piping to partially drain. The valve may not have fully seated when it was closed during the surveillance testing. Investigation into the cause for the water hammer is continuing and the results will be included in a supplemental report.

The clutch housing on the motor operator for MOV 2115 apparently fractured due to stress caused by the water hammer.

Analysis of Occurrence

Architect Engineer and Licensee Engineering calculations determined the maximum stress in the "A" core spray system during this occurrence was at the pipe restraint just upstream of MOV 2115. Assuming the maximum possible pipe movement (not observed), the maximum possible stress on the piping was calculated to be 22KSI, well below the allowable code value.

DUANE ARNOLD ENERGY CENTER

Iowa Electric Light and Power Company

LICENSEE EVENT REPORT-Supplemental Data

Licensee Event Report Date: February 25, 1977

Reportable Occurrence No: 77-9

Corrective Action

The clutch housing on the motor operator for MOV 2115 was replaced with a like-for-like clutch housing. The presently installed clutch housing is made of gray cast iron and per vendor recommendation, a clutch housing made from malleable cast iron will be installed when received on both MOV 2115 and its counterpart in the "B" core spray system, MOV 2135. The malleable cast iron housing is more ductile and less susceptible to stress failure.

A non conformance review has been initiated which includes an evaluation of the adequacy of the capacity of the RHR and core spray fill pump.

The "A" core spray system bypass test valve, MOV 2112, will be examined during the upcoming refuel outage to determine if repairs or adjustments are necessary.

A visual inspection of similar MOV clutch housing installations in the plant indicated no abnormal conditions.

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D. L. HAMMOND

# IOWA ELECTRIC LIGHT AND POWER COMPANY

DUANE ARNOLD ENERGY CENTER  
P. O. Box 351  
Cedar Rapids, Iowa 52406  
February 25, 1977  
DAEC - 77 - 138

Mr. James G. Keppler, Director  
Office of Inspection and Enforcement  
U. S. Nuclear Regulatory Commission-Region III  
799 Roosevelt Road  
Glen Ellyn, Illinois 60137

Subject: Licensee Event Report No. 77-9  
(14 day)

File: A-118a

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Very truly yours,

*Ellery L. Hammond*

Ellery L. Hammond  
Chief Engineer  
Duane Arnold Energy Center

Docket 50-331  
attachment

cc: Director, Office of Inspection and Enforcement (40)  
U. S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Director, Management Information and Program Control (3)  
U. S. Nuclear Regulatory Commission  
Washington, D.C. 20555

MAR 1 1977

# LICENSEE EVENT REPORT

**CONTROL BLOCK:**

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1                          6

**(PLEASE PRINT ALL REQUIRED INFORMATION)**

LICENSEE NAME					LICENSE NUMBER								LICENSE TYPE					EVENT TYPE					
01	I	A	D	A	0	0	-	0	0	0	0	0	-	0	0	4	1	1	1	1	0	1	
7	8	9		14	15										25	26					30	31	32

CON'T		CATEGORY		REPORT TYPE	REPORT SOURCE	DOCKET NUMBER						EVENT DATE					REPORT DATE								
01				T	L	0	5	0	-	0	3	3	1	0	2	1	1	7	7	0	2	2	5	7	7
7	8	57	58	59	60	61							68	69					74	75					80

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03	Due to discharge piping not being completely filled a water hammer caus	80
04	ed stress which resulted in the clutch housing of MOV 2115 fracturing.	80
05	"B" core spray system operable. Clutch housing fracture repetitive.	80
06	housing replaced. System integrity analysed to be uneffected. (RO 77-9)	80

PRIME

**CAUSE DESCRIPTION**

08	Unknown. Subsequent testing did not duplicate occurrence. Most probable	80
09	cause of initiation was shorted contacts when jumpers were removed. Inve	80
10	stigation of water hammer continuing. More ductile clutch housing to be	80

11	FACILITY STATUS E	% POWER 085	OTHER STATUS NA	METHOD OF DISCOVERY B	DISCOVERY DESCRIPTION NA
12	FORM OF ACTIVITY RELEASED Z	CONTENT OF RELEASE Z	AMOUNT OF ACTIVITY NA		LOCATION OF RELEASE NA

## PERSONNEL EXPOSURES

NUMBER				TYPE	DESCRIPTION
13	0	0	0	Z	NA

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NUMBER			DESCRIPTION
14	00	0	NA

## OFFSITE CONSEQUENCES

15	NA
7 8 9	80
LOSS OR DAMAGE TO FACILITY	

LOSS OR DAMAGE TO FACILITY

TYPE			DESCRIPTION
16	Z		NA

PUBLICITY

17	NA	80
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