

IE Circular 76-01

DATE:

CRANE HOIST CONTROL - CIRCUIT MODIFICATIONS

DESCRIPTION OF CIRCUMSTANCES:

In response to NRC concerns about the potential for, and consequences of, dropping a spent fuel shipping cask or other heavy load, Commonwealth Edison modified the hoist control system for the fuel cask handling cranes at their Dresden Units 2 and 3 and Quad cities Units 1 and 2 to provide additional hoist redundancy and slow speed hoist capability. The original design utilized a General Electric "magspeed" hoist control system. In this system which includes two electro-mechanical brakes in series, spring force holds the brakes engaged while DC solenoids, energized when the hoist motor is energized, disengage the brakes.

The modification which added the slow speed hoist capability included installing additional contactors in the brake solenoid power circuit to energize the solenoids when the low speed hoist motor was energized.

The original hoist control system design utilized a single Size 2 DC contactor (two contacts in series) in the solenoid circuit. The design modification added a circuit in parallel with the original DC contactor with utilized four AC rated Size 1 single contacts in a series-parallel array to distribute current carrying and interrupting burden.

Initial experience with the modified hoist control system at Dresden showed that the circuit interrupting capacity of the series-parallel array was marginal. On several occasions when the low speed motor was stopped in the lowering mode, the solenoid circuit contacts arced resulting in power being supplied to the solenoids long enough so that the load dropped some distance before the brakes engaged. Over travel of as much as 15 inches was reported, but no damage to hoist or load was found.

The crane manufacturer's representatives have advised the NRC that the proposed corrective action is to install a single Size 2 DC contactor (two contacts in series) with arc suppressors, the same as originally provided in the General Electric design, in place of the added four AC rated contacts. The original contactor in the normal speed control circuit has shown satisfactory service since initial operation of the plant in 1969.

ACTION TO BE TAKEN BY LICENSEE:

1. Determine and report to this office within 90 days the following information:
 - (a) Have you made, or do you plan to make modifications to the hoist control for your installed cranes similar to the described modifications?
 - (b) If such modifications have been made, or are planned, identify changes required in brake power and control circuitry?
 - (c) What steps have been taken or are planned, to provide assurance that brake power contactors are adequate for the service?
2. If modifications are planned, provide the schedule for completion and a brief description of your plans for design review and functional testing.

Your response should be submitted to the Director of this Office, with a copy to the Director, Division of Reactor Inspection Programs, Office of Inspection and Enforcement, U. S. Nuclear Regulatory Commission, Washington, D. C. 20555.

Approval of NRC requirements for reports concerning possible generic problems has been obtained under 44 U. S. C. 3152 from the U. S. General Accounting Office. (GAO Approval B-180255 (R0072), expires 7/31/77).

Enclosure:

Licensee Event Report dated 6/10/76

LICENSEE EVENT REPORT

CONTROL BLOCK:

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(PLEASE PRINT ALL REQUIRED INFORMATION)

LICENSEE NAME:

01	I	L	D	R	S	2
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 LICENSE NUMBER:

00	-	00	00	00	-	00
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 LICENSE TYPE:

4	1	1	1	1	1
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 EVENT TYPE:

0	2
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CONT:

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 CATEGORY:

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 REPORT TYPE:

L

 REPORT SOURCE:

L

 DOCKET NUMBER:

0	5	0	-	0	2	3	7
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 EVENT DATE:

0	5	1	2	7	6
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 REPORT DATE:

0	6	1	0	7
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EVENT DESCRIPTION

02 MALFUNCTION OF THE DRIVE BRAKES ON THE UNIT 2/3 REACTOR BUILDING CRANE SPECIAL SL
03 SPEED HOIST CAUSED THE UNIT-2 REACTOR VESSEL HEAD TO SLIP VERTICALLY ABOUT 15
04 INCHES AS IT WAS BEING LOWERED INTO PLACE, AN ATTEMPT TO CONTINUE LOWERING
05 RESULTED IN A SECOND 15-INCH DROP, AND THE SLOW-SPEED DRIVE WAS TAKEN OUT OF SERVICE
06 OPERATIONS WERE RESUMED USING THE NORMAL-SPEED DRIVE, SINCE THE SPECIAL SLOW-SPEED
(SEE ATTACHED SHEET)

SYSTEM CODE:

X	X
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 CAUSE CODE:

B

 COMPONENT CODE:

C	K	T	B	R	K
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 PRIME COMPONENT SUPPLIER:

0

 COMPONENT MANUFACTURER:

G	0	8	0
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 VIOLATION:

N

CAUSE DESCRIPTION

08 INVESTIGATION REVEALED THAT THE SLOW-SPEED HOIST BRAKES, WHICH WERE DESIGNED TO ENGAGE
09 UPON LOSS OF POWER TO A RELEASE SOLENOID, WERE FULLY ENGAGING ONLY AFTER A DELAY OF 1-
10 SECONDS. IT WAS FURTHER DISCOVERED THAT THE CONTACTOR FOR THE BRAKE RELEASE SOLENOID
(SEE ATTACHED SHEET)

FACILITY STATUS:

H

 % POWER:

0	0	0
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 OTHER STATUS:

NA

 METHOD OF DISCOVERY:

A

 DISCOVERY DESCRIPTION:

LOAD SLIPPED ON SIGNAL TO STOP

FORM OF ACTIVITY RELEASED:

Z

 CONTENT OF RELEASE:

Z

 AMOUNT OF ACTIVITY:

NA

 LOCATION OF RELEASE:

NA

PERSONNEL EXPOSURES

NUMBER:

0	0	0
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 TYPE:

Z

 DESCRIPTION:

NA

PERSONNEL INJURIES

NUMBER:

0	0	0
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 DESCRIPTION:

NA

OFFSITE CONSEQUENCES

NA

LOSS OR DAMAGE TO FACILITY

TYPE:

Z

 DESCRIPTION:

NA

PUBLICITY

NA

ADDITIONAL FACTORS

NA

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NAME: J.G. TOSCAS

PHONE: EXT. 443