

ACCELERATED DISTRIBUTION DEMONSTRATION SYSTEM

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:8807050465 DOC.DATE: 88/06/27 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 88-005-00:on 880527,premature termination of fire watch
 due to inadequate post-maint testing.

W/8 ltr.

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 TITLE: 50.73 Licensee Event Report (LER), Incident Rpt, etc.

NOTES:

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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										PAGE (3) 1 OF 0 4																					
TITLE (4) Premature Termination of Fire Watch Due to Inadequate Post-Maintenance Testing																																									
EVENT DATE (5) 0 5 2 7 8 8									LER NUMBER (6) 8 8 - 0 0 5 - 0 0									REPORT DATE (7) 0 6 2 7 8 8									OTHER FACILITIES INVOLVED (8) None														
OPERATING MODE (9) N									THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)																																
POWER LEVEL (10) 1 0 0									20.402(b) 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) 50.38(c)(1) 50.38(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)(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 366A)					
LICENSEE CONTACT FOR THIS LER (12) Kenneth S. Putnam, Technical Support Engineer																																									
NAME															TELEPHONE NUMBER 3 1 9 8 5 1 - 7 6 0 2																										
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														
D			K I Q			F I S V C			1 2 5			No																													
SUPPLEMENTAL REPORT EXPECTED (14) YES (If yes, complete EXPECTED SUBMISSION DATE) X NO																																									
ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)																								EXPECTED SUBMISSION DATE (15) MONTH DAY YEAR																	
<p>On May 27, 1988 at 1430 hours the plant was operating at 100% power, when maintenance activities on FSV 8522A (pilot control valve for fire suppression carbon dioxide injection to the Cable Spreading Room) were completed. The continuous fire watch, which was in place on the Cable Spreading Room, was secured when the Cable Spreading Room fire suppression system was returned to service. During follow-up review of the maintenance documentation, it was determined that the post-maintenance testing was inadequate to ensure that the solenoid valve would operate automatically as designed. The fire watch for the Cable Spreading Room was re-established at 1550 hours on the same day. Follow-up testing found the solenoid valve failed to cycle in the manner required by the Surveillance Test Procedure. Inoperability of Cable Spreading Room fire suppression system without a timely compensatory continuous fire watch is a condition prohibited by plant Technical Specifications. Maintenance activities were completed on May 28 and the Cable Spreading Room fire suppression system tested successfully and restored to normal service at 1130 hours. A Departmental Instruction is being developed to provide improved guidance on post-maintenance testing requirements.</p> <p>The was no affect on public health and safety as a result of this event.</p>																																									
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FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
Duane Arnold Energy Center (DAEC)	05000331	88	005	00	02	OF	04

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

I. DESCRIPTION OF EVENTS:

On May 27, 1988 the plant was operating at 100% power. At 0717 hours a continuous fire watch was established for the Cable Spreading Room in preparation for removing the Cable Spreading Room Carbon Dioxide (CO2) Fire Suppression System (EIS System Code KQ) from service for planned maintenance. The CO2 system was removed from service at 0735 hours for the repair of pilot solenoid valve KQ-FSV-8522A. This pilot solenoid valve functions to open one of two control valves which normally isolate the carbon dioxide storage tank from the Cable Spreading Room. The solenoid valve, by design, functions automatically upon receipt of a high temperature alarm from sensors within the Cable Spreading Room, a signal from the emergency pushbutton, or via local manual control. The system was fully operable prior to this activity.

Replacement of the solenoid valve was initiated due to the known obsolescence of the valve, historical difficulties in obtaining replacement parts, and difficulties in reseating. A new solenoid valve (vendor recommended replacement of updated design) was installed and the specified post-maintenance testing of leak testing was successfully performed. The CO2 system was returned to service at 1425 hours. The continuous fire watch was secured at 1430 hours. During the Operations Department review of the Maintenance Action Request following the work, the adequacy of the post-maintenance testing was questioned. In response to the concern, the continuous fire watch was re-established for the Cable Spreading Room at 1550 hours on the same day. At 1625 hours the applicable steps of the annual functional test for the CO2 system were performed. This test requires both manual actuation and simulated automatic actuation of all valves required for injection of CO2 using instrument air rather than CO2 as the operating medium. FSV-8522A failed to automatically actuate as required. Trouble shooting of the problem including consultation with the vendor concluded that the replacement solenoid valve differed from the original solenoid valve in that it required higher system pressure to operate. Bench testing of the replacement solenoid valve at the higher operating pressures expected with the CO2 system found the solenoid valve would open properly if pressurized prior to being energized. However, attempts to simulate the energize then pressurize sequence that would occur in actual service failed to actuate the valve as required. Consequently, operability of the CO2 system was degraded during the period of time from 1430 hours through 1550 hours without the Technical Specification required compensatory action of a continuous fire watch in place. This constitutes a condition prohibited by Technical Specifications and is reportable under 10 CFR 50.73(a)(2)(i).

II. CAUSE OF EVENT:

The root cause of the event was inadequate post-maintenance testing. The original maintenance action request specified that the only post-maintenance testing required was a verification of leak tightness.

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

Standard practice for valve replacement would require functional testing of the component. An intermediate cause which contributed to the event was a lack of vendor supplied detail on the difference in operating characteristics between the new model of the valve and the old model. This resulted in the inadequate performance of the valve as installed and tested. However, this problem would not have had unacceptable consequences if proper post-maintenance testing had been performed.

Tagouts of the CO2 system are common for work in the Cable Spreading Room for personnel safety. These tagouts do not require post-maintenance testing as no work is performed on the CO2 system. The repetitive nature of this task under different conditions may have contributed to this event.

III. ANALYSIS OF EVENT:

Throughout the period when the CO2 Fire Suppression System was known to be inoperable Technical Specifications were fully complied with and a fire watch was posted for the Cable Spreading Room. For the period from 1430 hours to 1550 hours the system was erroneously considered operable and consequently the Technical Specification required compensatory action of a continuous fire watch was not fulfilled. Within this one hour and 20 minute period, the system remained capable of discharging CO2 to the Cable Spreading Room in the manual mode. Fire detection equipment and associated alarms were available to alert control room operators in the event an actual fire had occurred. Alarm response procedures specifically require that an operator be immediately dispatched to the Cable Spreading Room to investigate the problem. By design, the CO2 discharge would not begin until at least 24 seconds following alarm initiation. With FSV-8522A in the degraded condition, an operator could readily manually initiate the CO2 discharge from the control panel directly outside the Cable Spreading Room door. Annunciators directly adjacent to one another in the control room would alert the control room operator that the fire had been detected without FSV-8522A opening as expected. The need for additional post-maintenance testing was identified prior to final Maintenance Action Request closeout during required administrative review. There was no affect on the public health and safety due to this event.

IV. CORRECTIVE ACTIONS:

Upon identifying the need for additional post-maintenance testing, operations personnel promptly re-established the continuous fire watch in the Cable Spreading Room at 1550 hours on May 27, 1988. The suitability of the new valve design for the application and the operability testing methodology using the much lower pressure instrument air system (instrument air supply is roughly 100 psia versus the 295 psig pressure of the CO2 system) requires further review and will be resolved prior to any future valve replacement of FSV-8522A. The

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original solenoid valve was re-installed and the system tested satisfactorily on May 28 at 1130 hours.

Long term corrective actions relating to inadequate post-maintenance testing will consist of the development of a specific Departmental Instruction on post-maintenance testing. This program is currently controlled under the broad Administrative Control Procedure for Corrective Maintenance. The new Departmental Instruction will provide detailed guidance on the requirements of post-maintenance testing. The new procedure will be developed by September 30, 1988 and will draw from the guidelines in the Institute of Nuclear Power Operations Good Practice MA-305, "Post-Maintenance Testing".

V. ADDITIONAL INFORMATION:

a. Failed Component Identification:

Replacement solenoid valve FSV-8522A was a normally de-energized Electro-Manual Pilot Valve (No. 20100083) supplied by the Chemtron Corporation.

b. Previous Similar Events:

No previous instances of missed fire watches due to inadequate post-maintenance testing were identified.

Iowa Electric Light and Power Company

June 27, 1988
DAEC-88-0498

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

Subject: Duane Arnold Energy Center
Docket No: 50-331
Op. License DPR-49
Licensee Event Report #88-005

Gentlemen:

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

Very truly yours,

 6-24-88
Rick L. Hannen
Plant Superintendent - Nuclear

RLH/KSP/go

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

NRC Resident Inspector - DAEC

File A-118a

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