

Iowa Electric Light and Power Company

July 9, 1993
NG-93-2759

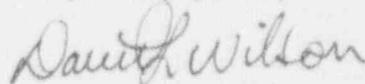
Mr. John B. Martin
Regional Administrator
Region III
U. S. Nuclear Regulatory Commission
799 Roosevelt Road
Glen Ellyn, IL 60137

Subject: Duane Arnold Energy Center
Docket No: 50-331
Op. License DPR-49
Licensee Event Report #93-004

Gentlemen:

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

Very truly yours,



David L. Wilson
Plant Superintendent - Nuclear

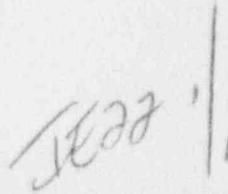
DLW/RM/eah

cc: Director of Nuclear Reactor Regulation
Document Control Desk
U.S. Nuclear Regulatory Commission
Mail Station P1-137
Washington, D. C. 20555

NRC Resident Inspector - DAEC

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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)

Duane Arnold Energy Center

DOCKET NUMBER (2)

05000 331

PAGE (3)

1 OF 5

TITLE (4) 'A' Emergency Diesel Generator Trip While Starting During Surveillance Testing

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
06	11	93	93	004	00	07	03	93		05000
									FACILITY NAME	DOCKET NUMBER
										05000

OPERATING MODE (9)	N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)			
		20.402(b)	20.405(c)	50.73(a)(2)(v)	73.71(b)
POWER LEVEL (10)	85	20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	OTHER
		20.405(a)(1)(iii)	X 50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	(Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
		20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME
Ronald M. McGee, Technical Support Specialist

TELEPHONE NUMBER (include Area Code)
(319)851-7602

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
X	EK	DG	F010	Y					

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE)	X	NO	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
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ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On June 11, 1993, with the plant operating at 85% power, while performing the Emergency Diesel Generator (EDG) operability surveillance, the 'A' EDG tripped approximately three seconds after the initial start signal. The most probable cause was determined to be a partially latched condition of the mechanical trip mechanism, although this condition was not able to be recreated during troubleshooting efforts. The partial latching may have challenged the operability of a single EDG for a period exceeding the technical specification limiting condition for operation of seven days. Corrective actions for this event include procedural enhancements, redundant reset operations, and engine stand improvements to facilitate efficient operation of the reset lever.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

EXPIRES: 5/31/95

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST 90 0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNB 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) Duane Arnold Energy Center	DOCKET NUMBER (2) 05000331	LER NUMBER (6)			PAGE (3)		
		YEAR 93	SEQUENTIAL NUMBER 004	REVISION NUMBER 00			

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

I. DESCRIPTION OF EVENT:

On June 11, 1993, at 0844 hours, while performing the routine Emergency Diesel Generator (EDG) surveillance test, the 'A' EDG tripped approximately three seconds after receiving its start signal. The trip was actuated by the mechanical trip mechanism, which has two direct inputs, engine overspeed and a local manual trip. Following the trip, the diesel was declared inoperable and the appropriate Limiting Condition for Operation (LCO) was entered.

Following inspection by mechanical maintenance, systems engineering and the vendor representative, and successful completion of the surveillance test, the 'A' EDG was declared operable at 1401 hours, June 12, 1993. The 'B' EDG surveillance was completed satisfactorily.

Review of the cause for the trip revealed the 'A' EDG may have been inoperable for a period exceeding the technical specification LCO of seven days. Based on a lack of evidence that would indicate a change in status of the latch mechanism since its previous operation on May 12, 1993, operability was indeterminate from that date to the June 11, 1993 surveillance. This event is being reported pursuant to 10CFR50.73(a)(2)(i)(B).

II. CAUSE OF EVENT:

A root cause team was formed to investigate this event. Immediately following the trip, Systems Engineering and Mechanical Maintenance inspected the trip mechanism. A vendor representative also inspected the engine trip mechanism the following morning. This inspection included visual observation of the trip mechanism components with a remote video camera while repeatedly tripping and resetting the mechanism. The conditions that led to the engine trip could not be recreated during the troubleshooting efforts. No component failures or inadequacies were located.

Several indications, such as a lack of generator frequency indication, insufficient time to achieve overspeed, and no "Engine Running" annunciator (which occurs at 90% of operating speed), rule out the possibility of an actual overspeed condition having occurred. Several root cause team members traveled to the vendor's headquarters to view and operate a training engine with cutaways to gain further insight into potential causal factors. Utilizing fault tree analysis techniques, the root cause team considered each individual component of the mechanical trip mechanism, interaction between components and other conditions that could impact performance.

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

EXPIRES 5/31/95

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST 50.6 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNB 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) Duane Arnold Energy Center	DOCKET NUMBER (2) 05000331	LER NUMBER(6)			PAGE(3)		
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					3	OF	5

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

The most likely cause for the event was a partially latched condition of the mechanical trip mechanism. The latch assembly holds a spring loaded plunger assembly in place, which if released, directly causes an engine trip through contact with the fuel cutout lever, which repositions the fuel racks to the 'no fuel' position. Engine vibration during the startup may have caused a partially engaged latch to release the plunger.

III. ANALYSIS OF EVENT:

The partially latched condition was potentially incurred on May 12, 1993, when the latch mechanism was last operated as part of the previous monthly surveillance test. This condition may have rendered the EDG inoperable for a period exceeding the technical specification LCO time period of seven days for one diesel generator inoperable. Testing indicated partial latching was an extremely low frequency outcome, however no other probable mechanism was identified.

This event had minimal effect on the safe operation of the facility. Had the 'A' EDG tripped during an event requiring its operation, operator action would have restored it to service in a very short timeframe. The 'B' EDG was available to provide emergency power between May 12 and June 11, 1993, except for approximately three minutes during the May 12th surveillance. Analysis for a postulated design-basis accident (DBA) is based on the operation of one diesel generator supporting its associated Low Pressure Coolant Injection (LPCI) and Core Spray subsystems, which were available throughout this time period. Unrelated maintenance on the 'B' Drywell Spray subsystem on June 8, 1993 for 10 hours, would have reduced the availability of containment cooling, however, mitigation of the DBA does not require drywell sprays.

The Duane Arnold Energy Center EDGs have exhibited a high degree of reliability. As reported to INPO, through the first quarter of 1993, the three year average EDG unavailability was 0.46%. Additionally, with this failure included, we remain within our allowable station blackout target reliability.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

EXPIRES 5/31/95

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 (MNB 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) Duane Arnold Energy Center	DOCKET NUMBER (2) 05000331	LER NUMBER(S)			PAGE(S)	
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TEXT (If more space is required, use additional NRC Form 388A) (17)

IV. CORRECTIVE ACTIONS:

To provide a high degree of assurance that the trip mechanism is fully latched, the following corrective actions have been implemented:

- a. Redundant reset - Appropriate procedure revisions have been made directing operators to manipulate the reset lever a second time following initial resetting of the trip. The second reset will allow the latch to fully engage in the event that the initial latching sequence resulted in a partially latched condition.
- b. Engine platforms - The spring that must be compressed to reset the latch is very firm and the reset lever is located high on the engine. To provide the operators with a better advantage from which to operate the reset lever, improvements will be made to facilitate a more advantageous position from which to operate the lever. This action will be completed by October 29, 1993.
- c. Routine resets - Operators will reset the latch mechanism at a minimum of once per day. This provides confidence that the latch is fully engaged during normal operation.
- d. Training - Training will be provided to operators on the proper method for resetting the trip mechanism. This training will be completed by July 30, 1993. Additionally, this event, including operation of the mechanical trip mechanism and proper reset operation, will be incorporated into operations continuing training by October 30, 1993.
- e. Additional inspections - In addition to the inspections performed immediately following the trip, a detailed visual inspection (via video equipment) of the 'A' EDG will be conducted during the upcoming refueling outage. Based on the results of the 'A' EDG inspection, the 'B' EDG may also be inspected.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

EXPIRES: 5/31/95

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 (MRRB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20545-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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

V. ADDITIONAL INFORMATION:

A) Failed components - The 'A' EDG failed to perform its intended function. This failure was discovered during routine surveillance testing.

B) There were no similar events located associated with a unwarranted mechanical trip of the diesel generators.

C) Applicable EIIS Codes

System Code:

Emergency Onsite Power Supply - EK

Component Code:

Overspeed device - 12 (INC)

Diesel Generator - DG

D) Engine Manufacturer - Colt Industries (C470), Fairbanks Morse Diesel Engine (F010)