

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)										DOCKET NUMBER (2)										PAGE (3)																																							
Duane Arnold Energy Center										05000331										1 OF 03																																							
TITLE (4)																																																											
Reactor Scram - Startup Transformer Trip Due to Spurious Deluge System Operation																																																											
EVENT DATE (5)										LER NUMBER (6)										REPORT DATE (7)										OTHER FACILITIES INVOLVED (8)																													
MONTH		DAY		YEAR		YEAR		SEQUENTIAL NUMBER		REVISION NUMBER		MONTH		DAY		YEAR		FACILITY NAMES										DOCKET NUMBER(S)																															
11		23		84		84		04		2		00		12		21		84		None										050000																													
11		23		84		84		04		2		00		12		21		84												050000																													
OPERATING MODE (9)										THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more of the following) (11)																																																	
N										20.402(b)										20.406(e)										X 50.73(a)(2)(iv)										73.71(b)																			
POWER LEVEL (10)										081										20.406(a)(1)(i)										50.36(a)(1)										50.73(a)(2)(v)										73.71(e)									
										20.406(a)(1)(ii)										50.36(a)(2)										50.73(a)(2)(vi)										OTHER (Specify in Abstract below and in Text, NRC Form 366A)																			
										20.406(a)(1)(iii)										50.73(a)(2)(i)										50.73(a)(2)(vii)(A)																													
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LICENSEE CONTACT FOR THIS LER (12)																																																											
NAME																				TELEPHONE NUMBER																																							
William J. Miller, Technical Support Supervisor																				AREA CODE																																							
																				319851-17238																																							
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																																																											
CAUSE		SYSTEM		COMPONENT		MANUFAC. TURER		REPORTABLE TO NPROS		CAUSE		SYSTEM		COMPONENT		MANUFAC. TURER		REPORTABLE TO NPROS																																									
X		EIA		XFMR				Yes																																																			
SUPPLEMENTAL REPORT EXPECTED (14)																																																											
YES (If yes, complete EXPECTED SUBMISSION DATE)																				X NO										EXPECTED SUBMISSION DATE (15)																													
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ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)																																																											
<p>While in normal power operation at approximately 81% power at 0640 hours on 11/23/84, a reactor scram occurred as a result of loss of non-vital busses. Prior to the event, nonvital busses were being supplied from offsite power via the startup transformer and vital busses were being supplied from offsite power via the standby transformer. A spurious startup transformer fire protection deluge system actuation occurred due to a slow leak in the pressurized sensing header surrounding the transformer coupled with foreign material within a pressure regulator that is designed to make up for minor header leakage. Approximately one minute following the deluge system actuation, the startup transformer tripped on phase differential when the deluge water spray above the transformer caused arching between the phase 2 bushing and the top of the transformer tank.</p> <p>The loss of nonvital busses (which were being supplied by this transformer) caused a turbine trip and turbine control and stop valve closure, which in turn initiated a reactor scram as designed. Reactor pressure peaked at approximately 1070 psig (slightly below SRV actuation setpoint) and vessel water level decreased from 193" to approximately 106" above top of active fuel due to void collapse. Automatic containment isolation Groups II through V (including SGTS) actuated as designed at reactor low level (170") and HPCI/RCIC initiated at low/low level (119.5"). (HPCI was being manually initiated by operators at the time as well in anticipation of void collapse.)</p> <p>HPCI injection promptly recovered level while turbine bypass valves controlled pressure at 920 psig and the MSIV's were closed approximately 15 minutes later. The subsequent cooldown was uneventful. Reactor startup commenced 2 days later following post-event review, transformer checkout, and deluge system trouble-shooting.</p>																																																											

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

EXPIRES 8/31/85

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)		
Duane Arnold Energy Center		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
		84	042	00	02	OF	03

TEXT (If more space is required, use additional NRC Form 365A's) (17)

While in normal power operation at approximately 81% power at 0640 hours on 11/23/84, a reactor scram occurred as a result of loss of non-vital busses. Prior to the event, nonvital busses were being supplied from offsite power via the startup transformer (EAS component code EA-XFMR-1X3) and vital busses were being supplied from offsite power via the standby transformer. A spurious startup transformer fire protection deluge system actuation occurred due to a slow leak in the pressurized sensing header surrounding the transformer coupled with foreign material within a pressure regulator that is designed to make up for minor header leakage. Approximately one minute following the deluge system actuation, the startup transformer tripped on unit phase differential (87 device) which in turn tripped the startup transformer lockout (86 device) when the deluge water spray above the transformer caused arching between the phase 2 bushing and the top of the transformer tank.

The loss of nonvital busses (which were being supplied by this transformer) caused a turbine trip and turbine control and stop valve closure, which in turn initiated a reactor scram as designed. Reactor pressure peaked at approximately 1070 psig (slightly below SRV actuation setpoint) and vessel water level decreased from 193" to approximately 106" above top of active fuel due to void collapse. Automatic containment isolation Groups II through V (including SGTS) actuated as designed at reactor low level (170") and HPCI/RCIC (BJ/BN' initiated at low/low level (119.5"). (HPCI was being manually initiated by operators at this time as well in anticipation of void collapse.)

HPCI injection recovered level to normal range. The loss of nonvital power caused loss of normal feedwater via the motor-driven reactor feed pumps. Reactor recirculation pumps (fed from nonvital power through motor generator sets) coasted down following the startup transformer trip. Vital busses prior to and throughout the event remained energized from the standby transformer; hence the emergency diesel generators did not receive an autostart demand signal.

Following the turbine trip and peak reactor pressure, the turbine bypass valves reduced and maintained reactor pressure at 920 psig. HPCI and RCIC were utilized for level control during this time. The control rod drive pumps were secured to prevent excessive vessel thermal stratification and excessive lower vessel cooldown rates.

In accordance with the DAEC emergency plan and 10 CFR 50.72, an Unusual Event was declared and notification completed to offsite agencies and the NRC. At approximately 15 minutes into the event operators closed the MSIV's in response to condenser vacuum decay. HPCI and RCIC continued to be utilized for level and pressure control. The RHR system (BO) was placed in torus cooling mode early in the event to reject the torus heat resulting from HPCI/RCIC Turbine discharge. The cooldown proceeded in an orderly and controlled manner.

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EXPIRES: 8/31/85

FACILITY NAME (1) Duane Arnold Energy Center	DOCKET NUMBER (2) 0 5 0 0 0 3 3 1	LER NUMBER (8)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
		8 4	— 0 4 2	— 0 0	0 3	OF	0 3

TEXT (If more space is required, use additional NRC Form 386A's) (17)

As a result of the loss of nonvital power, the NRC ENS telephone system was unavailable and communication problems similar to those identified in LER 84-040 were experienced (LER 84-040 involved loss of nonvital power due to catastrophic failure of the DAEC auxiliary transformer on 11/04/84). As a compensatory measure, alternate backup communication was augmented via partial activation of EOF personnel. Temporary vital power was provided to this equipment later in the day which restored normal communications capability. (Engineering efforts to provide this capability on a permanent basis have been expedited.) Restoration of the nonvital power occurred following full startup transformer checkout and troubleshooting of the deluge system spurious actuation. Startup activities were initiated on 11/25/84 following completion of post-event review and equipment checkout. The startup proceeded normally and without significant equipment or primary system chemistry problems.

Personnel response to the event were reviewed and determined to be appropriate. The fire brigade responded to the startup transformer deluge operation and promptly verified that a fire did not exist. Personnel properly utilized alternate communication systems to overcome the difficulties with normal communication systems. Personnel also acted to institute backup reactor water conductivity measurement and compensate for loss of nonvital power inconveniences.

Our evaluation of this event concluded that the prime cause of the transformer trip upon deluge system initiation was the deluge nozzle orientation. Modification to the nozzle orientation will be completed during our upcoming February, 1985 refueling outage to optimize deluge system effectiveness and minimize the risk of spurious transformer trips. Improvements have also been instituted in our deluge system maintenance actions.

Iowa Electric Light and Power Company

December 21, 1984
DAEC-84- 803

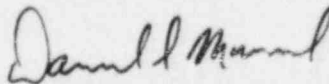
U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, D. C. 20555

Subject: Duane Arnold Energy Center
Docket No. 50-331
Op. License DPR-49
Licensee Event Report No. 84-042

Gentlemen:

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

Very truly yours,



Daniel L. Mineck
Plant Superintendent - Nuclear
Duane Arnold Energy Center

DLM/WJM/kp

attachment

cc: Mr. James G. Keppler
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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