LICENSEE EVENT REPORT (LER)

Form Rev 2.0

Facility Name (1)	Docket Number (2)	Page (3)
LaSalle County Station Unit 1	0 5 0 0 0 3 7 3	1 of 0 4

Title (4)

"O" Diesel Generator Cooling Pump Motor Failure Caused by Overheating Due to Failed Breaker

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)
									LaSalle Unit 2	0 5 0 0 0 3 7 4
0 8	2 2	8 8	8 8	0 1 8	0 0	0 9	2 0	8 8		0 5 0 0 0

OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (Check one or more of the following) (11)			
1		20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10)	0 9 8	20.405(a)(1)(i)	50.36(c)(1)	X 50.73(a)(2)(v)	73.71(c)
		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	Other (Specify in Abstract below and in Text)
		20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
		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	TELEPHONE NUMBER
	AREA CODE
Dale Spencer, Technical Staff Engineer, extension 649	8 1 5 3 5 7 - 6 7 6 1

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	B I	B K R	G 0 8 0	Y					

SUPPLEMENTAL REPORT EXPECTED (14)		Expected Submission Date (15)	Month	Day	Year
Yes (If yes, complete EXPECTED SUBMISSION DATE)	X NO				

ABSTRACT (Limit to 1400 spaces, i.e, approximately fifteen single-space typewritten lines) (16)

On August 22, 1988, at 1910 hours with Unit 1 and Unit 2 in Operational Condition 1 (Run) at 98% power and 70% power respectively, the "O" Diesel Generator (DG) cooling water pump (ODG01P), was running as supplied by its Unit 1 feed. At 1911 hours, the Unit 1 Nuclear Station Operator secured the pump from its Unit 1 feed. After the Unit 1 feed was secured, the pump attempted to restart on the Unit 2 feed in response to an auto start signal from Unit 2. At the time the motor attempted to start from Unit 2, the breaker cycled repeatedly but did not close. Upon attempting to restart the motor from Unit 1, it was determined the motor had failed. The motor failed due to heat buildup when the Unit 2 breaker cycled but failed to latch closed. The cause of the breaker failure is not known but most likely is due to a failure of the closing coil to fully close the breaker. The motor and breaker were replaced, testing completed and the system declared operable at 0505 hours on August 25, 1988. This event is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(v).

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PLANT AND SYSTEM IDENTIFICATION

General Electric - Boiling Water Reactor

Energy Industry Identification System (EIIS) codes are identified in the text as [XX].

A. CONDITION PRIOR TO EVENT

Unit(s): 1/2 Event Date: 8/22/88 Event Time: 1910 Hours

Reactor Mode(s): 1/1 Mode(s) Name: Run/Run Power Level(s): 98%/70%

B. DESCRIPTION OF EVENT

On August 22, 1988, at 1910 hours with Unit 1 and Unit 2 in Operational Condition 1 (Run) at 98% power and 70% power respectively, the "0" Diesel Generator (DG) cooling water [BK] pump (0DG01P), was running powered by its Unit 1 feed (135X compartment 103A). The "0" DG cooling water pump is a common piece of equipment, shared by both units, with Engineered Safety Feature (ESF) Division 1 electrical feeds from either unit. Prior to this event, the pump was supplying cooling water to ESF Division 1 equipment on both units. At 1911 hours, the Unit 1 Nuclear Station Operator (NSO, Licensed Station Operator) secured the pump from its Unit 1 feed. After the Unit 1 feed was secured, the pump attempted to restart on its Unit 2 feed (235X compartment 102A) in response to an auto start signal from Unit 2. This auto start signal was already present from the Unit 2 "A" Residual Heat Removal (RHR) [BO] room fan that was running. An electrical interlock in the dual breaker logic circuitry prevented a start signal from the Unit 2 feed from energizing the circuit prior to de-energizing the Unit 1 feed. The motor did not restart from the Unit 2 feed, however the breaker made 19 unsuccessful attempts at closing onto the bus. The Unit 2 handswitch was placed in pull to lock. Attempted restart from Unit 1 also resulted in an auto trip of the Unit 1 breaker. A visual inspection of the motor indicated the motor had failed.

C. APPARENT CAUSE OF EVENT

A visual inspection of the cooling water pump motor indicated that the motor had failed due to a fault in the motor windings. The fault was most likely caused by heating of the motor windings during the time the motor was repeatedly attempting to start from its Unit 2 feed.

The feature of the "0" Diesel Generator cooling water pump (0DG01P) to transfer its feed to the other unit if appropriate start signals are present is in accordance with plant design since the pump provides identical safety functions to each unit.

Additionally, the ability of the 0DG01P motor to transfer and restart from the opposite unit upon being shutdown has been proven by past operating experience.

C. APPARENT CAUSE OF EVENT (Continued)

The reason for the motor attempting to start several times from its Unit 2 feed appears to be due to a failure of the Unit 2 breaker to latch in the closed position. The General Electric (GE) model AK-2A-25 breaker must be mechanically latched in the closed position in order for the breaker to remain closed. The cause of the breaker repeatedly closing is not known but most probable causes include a failure of the breaker anti-pump scheme, a failure of the breaker to latch in the closed position due to a defective latching mechanism, or a weak closing coil. A failure of the anti-pump scheme would have required a trip signal to be present for the breaker to cycle as observed. Due to the fact that the motor operated satisfactorily on Unit 1 prior to this event and troubleshooting verified no external trip signals present, the anti-pump circuitry appears not to have failed. Therefore, the breaker appears to have failed by not latching in the closed position. However, an inspection of breaker internal revealed no apparent problems with the latching mechanism.

Three of four screws which secure a portion of the closing coil core were loose. Although the coil worked properly on the test bench, it is speculated that under less than full voltage conditions which may have existed at the switchgear compartment, this condition may have contributed to less than maximum force being available to move the breaker closing mechanism with the loose screws. This condition may have caused the breaker travel to be less than that required to fully latch and is regarded as the most probable cause.

The cause of the subsequent auto trip of the Unit 1 breaker appears to be an overcurrent trip caused by motor winding failure.

D. SAFETY ANALYSIS OF EVENT

The "0" Diesel Generator cooling water pump (0DG01P) provides cooling water to room coolers for Division 1 equipment on both units including "A" RHR room coolers, Low Pressure Core Spray (LPCS) [BM] pumps, Reactor Core Isolation Cooling (RCIC) [BN] and LPCS room coolers, and the common Diesel Generator which were declared inoperable as a result of this event. The consequences of losing the "A" RHR room coolers would be the inoperability of "A" Suppression Pool Cooling, and "A" Low Pressure Coolant Injection Cooling Modes of RHR as well as cooling water to the Hydrogen Recombiner (HG) [BB] from the "A" loop of RHR on both units. However, the fact that the "A" RHR room fan was available but without design heat removal capacity and Reactor Building Ventilation (VR) [VA] was available to assist in heat removal, would mitigate the consequences of the event. Additionally, the redundant "B" loop of RHR was available throughout this event to supply these functions to both units. The consequences of losing the room coolers for the LPCS/RCIC rooms as well as the LPCS pump cooling water would be the unavailability of LPCS. RCIC could eventually be lost due to high area temperatures. High Pressure Core Spray (HP) [BG] was available on both units throughout this event. Additionally, the LPCS/RCIC room supply fans were available to supply air to the area without design heat removal capabilities to each unit as well as VR to assist in heat removal from the pump rooms. The loss of cooling water to the "0" DG resulted in the unavailability of the DG to supply Division 1 loads on Unit 1 and Unit 2. Offsite power sources as well as the redundant Division 2 DG were available throughout this event as verified in accordance with Technical Specification 3.8.1.1.

E. CORRECTIVE ACTIONS

The motor was replaced with a motor which was originally installed on the "B" Auxiliary Electric Equipment Room Ventilation (VE) [VI] compressor (OVE04CB). The "B" VE compressor motor (OVE04CB) was replaced under Work Request L83268. Boiling Water Reactor Engineering Department evaluated the replacement motor and found it acceptable prior to declaring the system operable.

An inspection of the failed breaker latching mechanism and anti-pump circuitry was performed. No problems were found.

An inspection and cleaning of the Unit 2 breaker compartment was performed. No abnormalities were found.

Continuity checks were performed on the Unit 2 logic circuitry external to the breaker which revealed that spurious trip or close signals were not being generated by system logic.

A refurbished breaker was installed in Unit 2. DC voltages were monitored at the closing coil with the breaker installed at the switchgear compartment. Based on input from the breaker manufacturer (GE), the voltages measured were within specifications required to energize the closing coil.

LaSalle Electrical Surveillance, LES-GM-105, "Inspections of Low Voltage Air Circuit Breakers," now utilizes Locktite or equivalent on closing coil yoke screws of AK-2A and AK-2 breakers.

Trip checks were performed on the Unit 1 breaker as well as the original and refurbished breaker installed in Unit 2.

Vibration readings, phase currents, and AC bus voltages were measured and found acceptable with the motor coupled and uncoupled.

Measurements of motor starting time were measured by monitoring starting current decay time.

The motor was run from each unit's feed during testing.

Applicable portions of LaSalle Operating Surveillance LOS-DG-Q1, "DG 0 Auxiliaries Inservice Test," were performed to establish new cooling water pump baseline data and to verify operability.

The J D/G cooling water pump was returned to service at 0505 hours on August 25, 1988.

F. PREVIOUS EVENTS

None.

G. COMPONENT FAILURE DATA

Manufacturer	Nomenclature	Model Number	MFG Part Number
General Electric	Metal Clad Circuit Breaker	AK-2A-25	

Commonwealth Edison
LaSalle County Nuclear Station
Rural Route #1, Box 220
Marseilles, Illinois 61341
Telephone 815/357-6761

September 20, 1988

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

Dear Sir:

Licensee Event Report #88-018-00, Docket #050-373 is being submitted to your office in accordance with 10CFR50.73(a)(2)(v).

W.R. Ahnle

for G. J. Diederich
Station Manager
LaSalle County Station

GJD/DAS/kg

Enclosure

xc: Nuclear Licensing Administrator
NRC Resident Inspector
NRC Region III Administrator
INPO - Records Center

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