Commonwealth Edison
Zion Generating Station
101 Shiloh Blvd.
Zion, Illinois 60099
Telephone 312/746-2084

October 14, 1989

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

Dear Sir:

The enclosed Licensee Event Report number 88-017-01, Docket No. 50-304/DPR-48 from Zion Generating Station is being transmitted to you as a result of Inspection Number 295/89015.

Very truly yours,

T. P. Joyce
Station Manager
Zion Generating Station

TPJ/rmd

Enclosure: Licensee Event Report

cc: NRC Region III Administrator
NRC Resident Inspector
INPO Record Center
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LICENSEE EVENT REPORT (LER)

Form Rev 2.0

Facility Name (1)	Docket Number (2)	Page (3)
Zion Unit 2	0 5 0 0 0 3 1 4	1 of 0 4

Title (4)

Inoperable Reactor Cavity Vent Fan 2A Due to a Procedure Deficiency

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)
									N/A	
1 2	2 7	8 8	8 8	0 1 7	0 1	1 0	0 2	8 9	N/A	

OPERATING MODE (9)	POWER LEVEL (10)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (Check one or more of the following) (11)					
2	0 0 1	___ 20.402(b)	___ 20.405(c)	___ 50.73(a)(2)(iv)	___ 73.71(b)		
		___ 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 (Specify		
		___ 20.405(a)(1)(iii)	X 50.73(a)(2)(i)	___ 50.73(a)(2)(viii)(A)	in Abstract		
		___ 20.405(a)(1)(iv)	___ 50.73(a)(2)(ii)	___ 50.73(a)(2)(viii)(B)	below and in		
		___ 20.405(a)(1)(v)	___ 50.73(a)(2)(iii)	___ 50.73(a)(2)(x)	Text)		

LICENSEE CONTACT FOR THIS LER (12)

Name	TELEPHONE NUMBER AREA CODE
Stan Berczynski, Tech Staff Engineer ext. 349	3 1 2 7 4 6 - 2 0 8 4

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS

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 December 27, 1988 at 1400 hours Unit 2 was in hot stand-by at 1/2% power with TAVG about 550°F, Instrument Maintenance (IM) mechanics were assisting troubleshooting the 2B Reactor Cavity Vent Fan (which was shut off), and discovered that the 2A Reactor Cavity Vent Fan [VA] was running backwards. The condition of the 2A fan running backwards resulted in the fan being inoperable, and thus failed to meet Technical Specification Limiting Condition for Operation 3.2.2.C.3.a which requires one of two Reactor Cavity Vent Fans to be operating when the Reactor Coolant System average temperature (TAVG) is greater than 145°F.

The cause of the fan running backwards is suspected to be a wiring error. The 2A Reactor Cavity fan breaker had been recently rebuilt and rewired on December 12, 1988 which could have led to a rewiring problem and caused reverse rotation of the motor.

Upon discovery, the 2A fan was turned off, and the 2B fan was started. At 1700 hours of December 27, 1988, two of the three field wires at the 2A fan breaker were switched and the 2A fan was restored with proper air flow direction confirmed. A procedure change was made requiring post-maintenance rotation verification. This change and the incident itself were discussed with Electrical Maintenance personnel.

There were no abnormal temperature excursions in the Reactor Cavity during the time that the 2A fan was running backwards, hence, there was no significant impact on safety as a result of this event.

A. CONDITION PRIOR TO EVENT

MODE 2 - Hot Standby RX Power 1/2% RCS [AB] Temperature/ Pressure 550°F/2235 psig

B. DESCRIPTION OF EVENT

On December 27, 1988 at 1400 hours Unit 2 was in hot-standby at 1/2% power with TAVG about 550°F. Instrument Maintenance (IM) mechanics were assisting Electrical Maintenance with troubleshooting the 2B Reactor Cavity Vent Fan (while it was shut off), and discovered that the 2A Reactor Cavity Vent Fan [VA] was running backwards. Upon this discovery, the information was relayed to the Control Room and the 2A fan was turned off and the 2B fan was put into operation and verified to be rotating in the proper direction. (The 2B fan problem was that it would not shut off in "after-trip" but would shut off only in the "pull-to-lock" control switch position; this problem was later solved). The condition of the 2A fan running backwards resulted in the fan being inoperable, and thus failed to meet Technical Specification Limiting Condition for Operation 3.2.2.C.3.a which requires one of two Reactor Cavity Vent Fans to be operating when the Reactor Coolant System average temperature (TAVG) is greater than 145°F. Work Request #Z-76893 was used to find the cause of the 2A fan reverse rotation. From work request records for both 2A and 2B Reactor Cavity fans, the dates for the 2A fan during which it was running backwards were December 21 through 23, 1988 and December 27, 1988 until 1400 hrs.

C. APPARENT CAUSE OF EVENT

The cause of the fan running backwards is suspected to be a wiring error. The 2A Reactor Cavity Fan breaker had been recently rebuilt and rewired on December 12, 1988 according to Electrical Maintenance (EM) Department procedure, Motor Control Center Inspection, (E016-1) under Work Request #Z-76468. This could have led to a rewiring problem and resulted in reverse rotation of the motor. The rebuilding/rewiring of the breaker involved disconnecting the field side wires, replacing the breaker back stabs, and replacing some wires within the breaker cabinet. Prior to Unit 2 shutdown for refueling in October, 1988, there were no problems with Unit 2 Reactor Cavity temperature or problems with the Unit 2 Reactor Cavity fans. After speaking with the electrician who rewired the breaker, he conceded that two field wires could have been switched at the breaker back stabs but he wasn't sure if that was the case. The three field wires at the back stabs are all black. Procedure E016-1 used for breaker rewiring relies on craft capabilities in replacing wires in breaker cubicles. No specific guidance was provided to prevent this type of occurrence.

D. SAFETY ANALYSIS OF EVENT

The purpose of the Reactor Cavity fans is to remove gamma and thermal heat from the biological shield wall around the reactor vessel and to supply ventilation to cool the out-of-core instrumentation cavities. Maximum temperatures are limited to 150°F by design. Cooling air supplied to the reactor cavity is drawn from outside the crane wall areas and is discharged around the nozzles and up to the refueling pool area. There are two 100% capacity reactor cavity fans. These fans are not part of the engineered safeguards system and are not required to operate following a LOCA.

D. SAFETY ANALYSIS OF EVENT (Continued)

Computer-monitored temperature elements are located at the reactor cavity fan inlet and outlet (at four nozzle locations) and at the eight out-of-core instrumentation cavities. The high temperature alarm setpoint for a fan inlet is 120°F while the high temperature alarm setpoint for the fan outlet and out-of-core instrumentation is 150°F. These computer point alarms are monitored and alarm on an alarm typer located in the Unit 2 Computer Room connected to the Control Room. There were no high temperature alarms reported from the above computer points as per the SCRE (Shift Control Room Engineer) on duty during the shifts that the 2A fan was running backwards. This is not surprising since air was still being moved (although in the reverse direction) past the biological shield and out-of-core instrumentation, hence, cooling was occurring. Furthermore, the overall containment temperature in December is well under the maximum allowable 120°F which is only approached in July and August (this is irrespective of unit power).

Unit 2 was coming out of a refueling outage at the time of this event. The following is a table of Unit 2 operating modes from the time the 2A fan was rewired until the discovery that the 2A fan was running in reverse:

DATE	FAN STATUS	UNIT 2 MODE*
12/12 - 17/88	2B Rx Cavity Fan on (2A Rx Cavity Fan Rewired 12/12/88)	5
12/18/88	2B Rx Cavity Fan on	3, 4
12/19 - 20/88	2B Rx Cavity Fan on	3
12/21 - 23/88	2A Rx Cavity Fan on (running in reverse)	2, 3
12/24 - 26/88	2B Rx Cavity Fan on	2, 3
12/27/88	2A Rx Cavity Fan on until 1400 hours (when discovered running in reverse)	2

*Operating Modes: 2 - Hot Standby
3 - Hot Shutdown
4 - Hot Shutdown and Tavg $\leq$ 350°F
5 - Cold Shutdown

In conclusion, based on the above information regarding Reactor Cavity fans system design temperature, alarm setpoints, unit ambient temperatures, and lack of abnormal temperature excursions in the Reactor Cavity during the time that the 2A fan was running in reverse, there was no significant impact on safety as result of this incident.

E. CORRECTIVE ACTIONS

Upon discovery of the 2A Reactor Cavity Fan running backwards, the 2A fan was turned off and the 2B Reactor Cavity fan was put into operation and its rotation verified to be in the proper direction. To correct the rotation on the 2A fan, two field wires were switched in the 2A fan breaker (at 1700 hours on December 27, 1988). The 2A fan was restarted and proper flow direction was confirmed.

A procedure change requiring a post-maintenance rotation verification was made to E016-1 to minimize the probability of this type of event in the future. The fan label has (and has always had) arrows to indicate fan rotation and air flow direction.

The procedure change and this incident were discussed with Electrical Maintenance personnel.

F. PREVIOUS EVENTS

DVR#22-2-86-012 describes an event in which the EM department was involved regarding miswiring relays for 2FCV-MS57, Aux Feedwater Pump Turbine Main Steam Supply Shutoff. The corrective actions would not have prevented this event due to the nature of the corrective actions and time since occurrence.

G. COMPONENT FAILURE DATA

None