



Commonwealth Edison

Zion Generating Station
Shiloh Blvd. & Lake Michigan
Zion, Illinois 60099
Telephone 708 / 746-2084

December 11, 1990

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

Dear Sir:

The enclosed Licensee Event Report number 90-013-00, Docket No. 50-304/DPR-48 from Zion Generating Station is being transmitted to you in accordance with the requirements of 10CFR50.73(a)(2)(iv), which requires a 30 day written report when any event or condition occurs that results in manual or automatic actuation of any Engineered Safety Feature.

Very truly yours,

W. R. Kincaid
for T. P. Joyce
Station Manager
Zion Generating Station

TPJ/dmg

Enclosure: Licensee Event Report

cc: NRC Region III Administrator
NRC Resident Inspector
INPO Record Center
CECo Distribution List

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9012140064 901211
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LICENSEE EVENT REPORT (LER)

Form Rev 2.0

Facility Name (1) Zion Unit 2						Docket Number (2) 0 5 0 0 0 3 0 4				Page (3) 1 of 0 3		
Title (4) Turbine trip/Reactor trip due to sensed loss of turbine bearing oil pressure												

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)							
1	1	9	0	0	1	3	0	0	1	2	1	1	9	0	N/A			

OPERATING MODE (9) 1

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (Check one or more of the following) (11)

20.402(b)	20.405(c)	X	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 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)	50.3(a)(2)(iii)		50.73(a)(2)(x)	

POWER LEVEL (10) 0 9 9

LICENSEE CONTACT FOR THIS LER (12)

Name	TELEPHONE NUMBER
Bob Pocius, System Engineer ext. 2301	AREA CODE 7 0 8 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
X	T S	C M	W 1 2 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 11-11-90 at 1014 Zion Unit 2 tripped due to a sensed loss of Main Turbine bearing oil pressure. The diaphragm in the bearing oil section of the Turbine Trip Device (TTD) had ruptured. This sensed loss of bearing oil pressure actuated the TTD which tripped the turbine. The turbine bearings were not damaged, as they did not lose oil pressure.

The root cause analysis determined that the diaphragm had been in service past its service life expectancy. Signs of cracking and hardness were visible.

Following verification of the new diaphragm shelf life, it was placed into the TTD. After performing PT-101 "Main Turbine Protective Device Trip Test", Section 5.2 "Low Bearing Oil Pressure Trip Test", the unit was returned to service. Currently a Preventive Maintenance procedure is being created to ensure that the TTD is properly maintained at each refuel outage.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

Form Rev 2.0

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)						Page (3)		
		Year	Sequential Number	Sequential Number	Sequential Number	Revision Number	Revision Number	Revision Number		
Zion Unit 2	0 5 0 0 0 3 0 4	9 0	-	0 1 3	-	0 0	0 2	OF	0 3	

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

A. CONDITIONS PRIOR TO EVENT

MODE 1 - Power RX Power 99 RCS [AB] Temperature/ Pressure 558 °F/ 2235 psig

B. DESCRIPTION OF EVENT

At 1013 the Unit 2 turbine bearing oil low pressure annunciator alarmed. Main Control Board (MCB) turbine bearing oil pressure indicator 2PI-T006 read normal oil pressure at ~ 16 psig. An equipment operator was instructed to verify turbine bearing oil pressure at the front standard of the turbine. He was present at the front standard when the turbine tripped at 1014. He reported that local indicator 2PI-T006A read ~ 16.9 psig before and after the turbine trip.

The sequence of events report at the time of the turbine trip/reactor trip indicated that the turbine auto stop oil switches 63AST-1 and 63AST-3 actuated to trip the turbine, followed by a reactor trip. Auto stop oil is dumped through the turbine trip device (fulcrum trip) on low bearing oil pressure, low vacuum, or thrust bearing wear, thus the turbine trip device (.D) actuated.

The reactor operator and equipment operator observed no loss of oil pressure because the indicators they normally observe do not sense pressure off the same piping as the TTD. Indicators 2PI-T006 and 2PI-T006A tap off the main oil supply piping going to the turbine, whereas the TTD taps off of the #1 bearing for its pressure signal. There is an indicator, 2PI-TSS63LB0, at the turbine front standard that reads the same oil pressure that the TTD senses; however, after the trip, indicator 2PI-TSS63LB0, read ~ 16 psig. The sensed loss of bearing oil pressure at the TTD, was momentary at the time of the diaphragm rupture. The diaphragm is held in place by a stem mounted spring. Spring pressure allowed the oil pressure to increase after the rupture, as verified by lifting the low bearing oil diaphragm stem and allowing oil to pass through the ruptured diaphragm; oil pressure at gauge 2PI-TSS 63LB0 then dropped.

C. APPARENT CAUSE OF EVENT

The root cause of this turbine trip/reactor trip was a failed diaphragm in the turbine bearing oil pressure section of the TTD. The bearing oil pressure diaphragm was found ruptured, apparently due to age. No documentation exists regarding when this diaphragm was last replaced; however, it is thought that these diaphragms were changed in 1986 at the time of the low pressure turbine replacement.

According to Westinghouse, these diaphragms have a minimum service life of five years and a maximum shelf life of 8-10 years. Westinghouse has used the same diaphragm material for 30 years, and it is used in all fossil and nuclear units.

D. SAFETY ANALYSIS OF EVENT

This event had no safety significance with the exception of the significance normally attributed to a reactor trip. The reactor trip followed the turbine trip as a result of the sensed loss off bearing oil pressure. All safety systems operated as designed.

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E. CORRECTIVE ACTIONS

The diaphragm was replaced with a new one. The shelf life was verified to be acceptable. Following replacement of the diaphragm, PT-101 "Main Turbine Protective Device Trip Test", Section 5.2 "Low Bearing Oil Pressure Trip Test" was performed and the unit was returned to service. Parts were not available to replace the other two diaphragms in the TTD. This replacement will be scheduled for the next Unit 2 refueling outage via the PM program.

Previous problems with the MCB turbine trip pushbuttons, which energize the 20AST-1 solenoid on the TTD have resulted in the need to have Preventative Maintenance (PM) performed on a regular basis. Presently commitment #304-200-89-09201, is assigned to Maintenance Staff to create a PM procedure.

The Westinghouse Total Maintenance Service (TMS) recommends that the TTD be inspected every refuel outage. Although the inspection requirement is vague in specifying any actual work to be performed, the procedure will consider replacement of all diaphragms and the solenoid, cleaning, replacement of worn parts and all calibrations that can be performed. This PM will take place during each refuel outage.

F. PREVIOUS EVENTS

No previous turbine trips at Zion were due to ruptured diaphragms in the turbine trip device.

Westinghouse has had only 4 failures reported as a result of ruptured diaphragms in the TTD.

G. COMPONENT FAILURE DATA

These diaphragms are supplied by Westinghouse Electric Corporation, part no 268A111001, SI# 148621.

The diaphragm material is Dupont 5051 and the approximate size is 3 3/8 x 3 3/8 x 1/16 thick.