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SUBJECT: LER 90-017-00:on 900806,turbine trip/manual scram due to turbine generator bearing failure.

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NMP70142

September 4 , 1990

United States Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

RE: Docket No. 50-220
LER 90-17

Gentlemen:

In accordance with 10 CFR 50.72, we hereby submit the following Licensee Event Report.

LER 90-17 Which is being submitted in accordance with 10 CFR 50.73 (a)(2)(iv), "Any event or condition that resulted in manual or automatic actuation of any Engineered Safety Feature (ESF), including the Reactor Protection System (RPS). However, actuation of an ESF, including the RPS, that resulted from and was part of the preplanned sequence during testing or reactor operation need not be reported".

A 10 CFR 50.72 report was made at 1830 hours on August 6, 1990.

This report was completed in the format designated in NUREG-1022, Supplement 2, dated September 1985.

Very truly yours,

Joseph F. Firlit
Vice President - Nuclear Generation

JFF/DPS/lmc

ATTACHMENT

cc: Thomas T. Martin, Regional Administrator, Region I
W. A. Cook, Sr. Resident Inspector

IE22
1/1

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NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/88

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Nine Mile Point Unit 1	0 5 0 0 0 2 2 0	1 OF 0 5

TITLE (4)
Turbine Trip/Manual Scram Due To Turbine Generator Bearing Failure

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	0 5 0 0 0
0 8	0 6	9 0	9 0	0 1 7	0 0	0 9	0 4	9 0	N/A	0 5 0 0 0

OPERATING MODE (9)	N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
POWER LEVEL (10)	0 1 9	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, NRC Form 366A)
		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
Ken Sweet - Superintendent of Maintenance Unit 1	AREA CODE 3 1 5 — 3 4 9 - 2 4 6 2

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
D	T D		G 0 8 4	No					

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 6, 1990, with the reactor mode switch in the RUN position, reactor power at 19 percent, Nine Mile Point Unit 1 (NMP1) experienced turbine bearing vibration problems when starting up the turbine-generator. The turbine was manually tripped, condenser vacuum was broken, and a manual reactor scram was inserted. Consequently, a High Pressure Coolant Injection (mode of feedwater control) signal was received due to low reactor water level (53 inches) and a Main Steam Isolation Valve isolation occurred on decreasing condenser vacuum (7 inches mercury Hg).

The immediate cause of this event was the failure of turbine bearing #5 due to a blank found installed in the bearing oil supply line. An incident investigation determined that the cause of the event was inadequate review of a policy change and personnel error.

Immediate corrective actions included repair of the bearing, inspection of the other bearing oil supply lines, inspection/ cleanup of the turbine lube oil tank and screens, and revising the procedure/process that controls the blank installation. Additionally, a review of the NMPC turbine maintenance log was performed to identify any other potential weaknesses.

I. DESCRIPTION OF EVENT

On August 6, 1990, with the reactor mode switch in the RUN position, reactor power at 19 percent, Nine Mile Point Unit 1 (NMP1) experienced turbine bearing vibration problems while starting up the turbine-generator. The turbine was manually tripped, condenser vacuum was broken, and a manual reactor scram was inserted. Consequently, a High Pressure Coolant Injection (mode of feedwater control) signal was received due to low reactor water level (53 inches) and a Main Steam Isolation Valve isolation occurred on decreasing condenser vacuum (7 inches mercury Hg).

On the day of the event, the plant operators were rolling the turbine in preparation for putting the generator on line. Since this was the first time that the turbine was being operated during the NMP1 power ascension program, Operations, Maintenance, and System Support personnel were present at the turbine on 300' elevation in the Turbine Building. Earlier in the day, the turbine was initially rolled when some mechanical noise was heard from the excitor housing and a rub was experienced at the high pressure turbine causing high vibration. The turbine was shut down and placed on the turning gear to allow the rotor and steam chest temperatures to equalize while a repair was made to the excitor fan housing. Later in the shift the turbine was rolled again. Initial turbine acceleration went smoothly. It should be noted that at this point (approximately 850-950 revolutions per minute [RPM]) the bearing oil lift pumps are secured and the main bearing oil pump now supplied the turbine bearings. Their supply lines are separate. At approximately 1200 RPM, personnel on the turbine deck noticed that there was abnormal vibration at the #5 bearing. The bearing oil discharge temperature was checked and found to be above normal (with respect to the other bearing oil temperatures) at 160 degrees Fahrenheit. The control room was notified to check #5 bearing vibration instrumentation readings. The reading for #5 was approximately 3 mils, which was normal. Operations continued to increase turbine speed. At approximately 1750 RPM, the #5 bearing began to exhibit higher vibration. The bearing oil drain temperature was checked again for #5 and found to be 190 degrees Fahrenheit; it also appeared darker in color. At this time the unit Maintenance Supervisor (present on the turbine deck) called the control room and requested them to shut down the turbine. This was followed by a second phone call from operators on the deck requesting that the turbine be immediately tripped.

At 1730:02 hours, the turbine was manually tripped by the control room operators. While tripping the turbine the operators held down the High Pressure Coolant Injection (mode of feedwater control HPCI) reset buttons. This allows the normal Feedwater controllers

to remain in control of the Feedwater flow control valves versus having them shift to their HPCI controllers and ensures better control over reactor water level changes when taking the turbine off-line. However, another phone call was received from the turbine deck requesting that the control room break condenser vacuum (to help slow down the turbine). At this point the control room operators decided they should manually scram the reactor after breaking condenser vacuum in anticipation of the low condenser vacuum scram signal (23 inches mercury) that would be received. The condenser vacuum breakers were opened and a manual scram was inserted at 1732:13 hours. Reactor water level rapidly dropped after the scram to 47 inches due to void collapse and the resulting shrinkage, with HPCI initiating and a second scram signal being generated (at 53 inches). These are expected occurrences during this type of transient. Water level was restored, HPCI was reset and eventually #12 motor-driven Feedwater pump was secured to control the water level increase.

As condenser vacuum decreased, all expected alarms came in and eventually the Main Steam Isolation Valves isolated on low-low condenser vacuum (7 inches). Reactor pressure and temperature decreased slowly due to lack of decay heat. The turbine coast down time was approximately 20 minutes with condenser vacuum broken. Normal coast down time would have been about 1 hour and 30 minutes with vacuum.

A 4 hour non-emergency telephone notification was made to the NRC at 1830 in accordance with 10CFR50.72(b)(2)(ii). The reactor scram was reset at approximately 1834.

During subsequent inspection of the #5 turbine bearing, a blank was found in its oil supply line, resulting in inadequate oil flow and failure of the bearing.

II. CAUSE OF EVENT

An incident investigation determined that the cause of the event was inadequate review of a policy change and personnel error. Past practice had been to physically wire blanks to their respective oil supply lines to provide a positive visual check that the blanks were not installed.

This outage an inventory control log was introduced placing the blanks in the turbine floor tool crib when not in use.

This policy change introduced additional administrative controls with respect to the handling of the blanks, and in this case

increased the possibility for human error. It also removed the post maintenance visual checks conducted by the Maintenance and Operations departments.

III. ANALYSIS OF EVENT

This event is reportable in accordance with 10CFR50.73 (a)(2)(iv): "Any event or condition that results in manual or automatic actuation of any Engineered Safety Feature (ESF), including the Reactor Protection System (RPS). However, actuation of an ESF, including RPS, that results from and was part of the preplanned sequence during testing or reactor operation need not be reported".

The manual reactor scram was inserted to preclude an auto scram on decreasing main condenser vacuum at 23 inches Hg. Consequently, the MSIV's auto closed at 7 inches vacuum and an auto scram occurred on low level of 53 inches of water with a HPCI initiation.

There were no significant safety consequences as a result of this event nor was the reactor in an unsafe condition at any time. The initiation of HPCI is a protective mode of operation and thus performed its intended safety function. The plant was then stabilized and the auto scram was reset. Therefore, the health and safety of plant personnel and the general public was not affected.

IV. CORRECTIVE ACTIONS

Immediate corrective actions consisted of:

- Tripping the turbine.
- Manually scramming the reactor.
- Breaking vacuum in the condenser to slow the turbine as soon as possible.
- Initiate a Work Request to disassemble and repair #5 bearing.

Additional corrective actions included:

1. Removing a blank on #5 bearing oil feed line.

2. Inspecting all bearing feed lines and verified blanks were removed.

3. Review of the maintenance log to see if any other problems may not have been identified, none could be found.

4. General Electric was also asked if any problems may not have been identified, none could be identified at the time. Oil was removed from the main oil tank, the screen and tank were inspected and cleared, the inlet screens allowed very little babbit residue to enter the main oil tank.

5. In the future, the blanks used to blank oil feeds to bearings shall be wired to the flanges.

6. Start-up, normal operation, and shutdown procedure N1-OP-43 was changed by adding a step to have Operations verify blanks are wired to the flanges. If these blanks are not visible, it shall be assumed that they are installed and the turbine is not ready for operation. Mechanical Maintenance would then be contacted to disassemble the flange and verify that the blank is removed.

V. ADDITIONAL INFORMATION

A. Previous similar events:

There have been no previous similar events associated with blanks being left in oil lines at Nine Mile Point Unit 1.

B. Components referred to in this Licensee Event Report:

COMPONENT	IEEE 803 FUNCTION	IEEE 805 SYSTEM
High Pressure Coolant Injection	NA	BJ
Turbine Generator	NA	TA
Main Steam Isolation Valve	ISV	SB
Bearing Oil Lift Pumps	P	TD
Feedwater Controllers	FC	SJ
Manual Scram	NA	AA
Turbine Bearing	NA	TD

C. Failed components:

Turbine Bearing
Manufacturer - General Electric
Component Identification - TD-5