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10CFR50.73

July 18, 2002

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Limerick Generating Station, Unit 1
Facility Operating License Nos. NPF-39
NRC Docket Nos. 50-352

Subject: LER 1-02-003, Unit 1 Scram due to Actuation of Main Turbine Thrust Bearing Wear Detector

This Licensee Event Report (LER) addresses an actuation of the Unit 1 main turbine thrust bearing wear detector that resulted in a main turbine trip and reactor scram.

Report Number:	1-02-003
Revision:	00
Event Date:	May 19, 2002
Discovered Date:	May 19, 2002
Report Date:	July 18, 2002

This LER is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(iv)(A).

If you have any questions or require additional information, please do not hesitate to contact us.

Sincerely,

William Levis
Vice President - Limerick

cc: H. J. Miller, Administrator Region I, USNRC
A. L. Burritt, USNRC Senior Resident Inspector, LGS

IE22

NRC FORM 366 (1-2001) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104 EXPIRES 6-30-2001

Estimated burden per response to comply with this mandatory information collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bjs1@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Limerick Generating Station, Unit 1	05000 352	1 OF 4

TITLE (4)

Scram due to Actuation of Main Thrust Bearing Wear Detector

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
05	19	2002	2002	003	00	07	18	2002		

OPERATING MODE (9)	1
POWER LEVEL (10)	100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply) (11)

20.2201(b)	20.2203(a)(3)(ii)	50.73(a)(2)(ii)(B)	50.73(a)(2)(ix)(A)
20.2201(d)	20.2203(a)(4)	50.73(a)(2)(iii)	50.73(a)(2)(x)
20.2203(a)(1)	50.36(c)(1)(i)(A)	X 50.73(a)(2)(iv)(A)	73.71(a)(4)
20.2203(a)(2)(i)	50.36(c)(1)(ii)(A)	50.73(a)(2)(v)(A)	73.71(a)(5)
20.2203(a)(2)(ii)	50.36(c)(2)	50.73(a)(2)(v)(B)	OTHER Specify in Abstract below or in NRC Form 366A
20.2203(a)(2)(iii)	50.46(a)(3)(ii)	50.73(a)(2)(v)(C)	
20.2203(a)(2)(iv)	50.73(a)(2)(i)(A)	50.73(a)(2)(v)(D)	
20.2203(a)(2)(v)	50.73(a)(2)(i)(B)	50.73(a)(2)(vii)	
20.2203(a)(2)(vi)	50.73(a)(2)(i)(C)	50.73(a)(2)(viii)(A)	
20.2203(a)(3)(i)	50.73(a)(2)(ii)(A)	50.73(a)(2)(viii)(B)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Marino Kaminski, Manager Regulatory Assurance	(610) 718-3400

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

Cause	System	Component	Manufacturer	Reportable to EPIX	Cause	System	Component	Manufacturer	Reportable to EPIX
B	IT	DET	G080	Yes					

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 15 single-spaced typewritten lines) (16)

An actuation of the Unit 1 main turbine thrust bearing wear detector (TBWD) occurred during scheduled testing of the main turbine combined intermediate valves (CIV). Excessive clearances within the thrust bearing assembly allowed 31 mils of axial displacement on the main turbine shaft during closure of CIV-2. This was detected by the TBWD and caused an actuation. Detailed inspections of the detector and partial disassembly of the housing were performed. The TBWD trip will be bypassed during CIV testing.

LICENSEE EVENT REPORT (LER)

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	05000	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	OF	
Limerick Generating Station Unit 1	352	2002	-- 003 --	00	2	4

NARRATIVE *(If more space is required, use additional copies of NRC Form 366A)* **(17)**

Unit Conditions Prior to the Event

Unit 1 was in Operational Condition (OPCON) 1 (Power Operation) at approximately 94% power. There were no structures, systems or components out of service that contributed to this event.

Description of the Event

On May 18, 2002, at 22:12 hours, power was reduced to 94% to perform main turbine (EIIS:TRB) control valve (TCV) , stop valve (TSV), and combined intermediate valve (CIV) (EIIS:SHV) testing. The Main Turbine Control Valve Exercise & RPS Channel Functional Test (ST-6-001-765-1) was completed without incident. The TSV portion of the Main Turbine CIV, Stop Valve RPS & EOC-RPT Channel Functional Test was also completed without incident.

During the CIV portion of the test, specifically during closure of CIV-2 at 00:54 hours on May 19, 2002, an actuation of the main turbine thrust bearing wear detector (TBWD) (EIIS:DET) occurred. The actuation of the TBWD resulted in a main turbine trip. The subsequent closure of the TSVs at greater than 30% power caused an actuation of the reactor protection system (RPS) which resulted in a reactor scram as designed. All controls rods inserted as designed.

Reactor pressure peaked at approximately 1122 psig by the upset range instrumentation and was controlled by the main turbine bypass valves (BPV). The lowest main steam relief valve (MSRV) setpoint of 1170 psig was not exceeded; therefore, no actuation of MSRVs occurred.

Reactor narrow range level dropped to approximately -7 inches and the Group 2 RHR isolation occurred as designed at +12.5 inches. Reactor level subsequently increased to approximately +57 inches resulting in high-level trip of the reactor feed pumps (RFP) and High Pressure Coolant Injection (HPCI) at +54 inches. The Main Turbine also received a high-level trip signal but had been previously tripped by the TBWD actuation. The discharge valve for the 1A RFP would not close from the Main Control Room control switch due to a defective contactor in the motor control center (MCC) and was closed using the MOV local hand-wheel. The 1A RFP was reset and used to control reactor level.

Following plant restart it was determined that the feedwater level control master controller setpoint setdown feature did not actuate as designed due to a lifted lead restoration error that occurred during the prior refueling outage (1R09) in March 2002. The failure of this feature contributed to the high level trip of the RFPTs following the scram. The setpoint setdown feature has been scheduled for repair during the next outage opportunity.

In addition, the 1A & 1B Reactor Recirc pump M-G sets tripped as designed during the fast-transfer of the 13kV Unit Auxiliary buses and the RPT-EOC trip actuated due to closure of the TSVs above 30% power.

This event involved an actuation of the RPS system when the reactor was critical and a valid actuation of the RPS system. The 4-hour ENS notification required by 10CFR50.72(b)(2)(iv)(B) and the 8-hour ENS notification required by 10CFR50.72(b)(3)(iv)(A) were completed on May 19, 2002 at 03:33 hours (Event# 38927).

This event involved an automatic actuation of the reactor protection system. Therefore, this LER is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(iv)(A).

Analysis of the Event

There were no actual safety consequences associated with this event. The potential safety consequences of this event were also minimal. The TBWD actuation resulted in a main turbine trip and reactor scram as designed. Reactor critical parameters were monitored and controlled by Operations.

The normal thrust on the main turbine shaft is in the direction of the front standard and loads the thrust bearing rear surface. Closure of a CIV causes a change in the overall thrust on the main turbine shaft that results in a change in the loading on the rear surface, or a thrust reversal that loads the front surface. During this event the thrust bearing load shifted from the rear surface to the front surface resulting in 31 mils of main turbine shaft axial displacement. This is 18 mils greater than the expected thrust bearing clearance.

If 31 mils or greater of axial displacement is sensed by the TBWD, a turbine trip signal is generated to protect the turbine from internal damage. The 31 mils of axial displacement was sufficient to cause the actuation of the TBWD due to exceeding the setpoint. Testing during plant restart confirmed that a thrust reversal occurs during closure of CIV-2.

The main turbine differential expansion recorder detected 31 mils of main turbine shaft axial displacement prior to the actuation of the TBWD. This instrument was corroborated during restart testing by use of a proximity probe axial position indicator that was installed during the forced outage. Testing performed during the forced outage did not identify an excessive clearance in the thrust bearing.

During the prior refueling outage (1R09, March 2002) a periodic inspection of the thrust bearing wear detector was performed; no degradation was identified. In addition, corrective maintenance was performed that replaced the thrust bearing thermocouple.

Cause of the Event

The main turbine shaft experienced a thrust reversal during CIV-2 testing that caused 31 mils of axial displacement exceeding the TBWD setpoint. Looseness in the structure that holds the thrust bearing in place is the most likely cause of the excessive main turbine shaft axial displacement. It is possible but less likely that a false actuation of the TBWD caused the main turbine trip.

Corrective Action Completed

The Unit 1 CIV test procedures have been revised to bypass the TBWD trip during testing of the CIVs.

An inspection of the TBWD was successfully performed during the forced outage.

Corrective Actions Planned

The TBWD will be replaced with an improved model during the next refueling outage on Unit 1 scheduled for 2004 and the refueling outage on Unit 2 scheduled for 2005.

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NARRATIVE *(If more space is required, use additional copies of NRC Form 366A)* **(17)**

The Unit 1 main turbine thrust bearing assembly will be inspected during the next refueling outage or outage opportunity of sufficient duration.

Previous Similar Occurrences

There were no previous occurrences of actuation of the TBWD.