PHILADELPHIA ELECTRIC COMPANY

LIMERICK GENERATING STATION

P. O. BOX A

SANATOGA, PENNSYLVANIA 19464

(215) 327-1200 EXT. 2000

J. DOERING, JR.
PLANT MANAGER
LIMERICK GENERATING STATION

January 2, 1991
Docket No. 50-352
License No. NPF-39

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

SUBJECT: Licensee Event Report
Limerick Generating Station - Unit 1

This LER reports actuation of the Reactor Protection System resulting from an inadequacy in a surveillance test procedure.

Reference:	Docket No. 50-352
Report Number:	1-90-030
Revision Number:	00
Event Date:	December 2, 1990
Report Date:	January 2, 1991
Facility:	Limerick Generating Station P.O. Box A, Sanatoga, PA 19464

This LER is being submitted pursuant to the requirements of 10 CFR 50.73(a)(2)(iv).

Very truly yours,

J Doering

JLP:cah

cc: T. T. Martin, Administrator, Region I, USNRC
T. J. Kenny, USNRC Senior Resident Inspector, LGS

IE22
1/1

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)
Limerick Generating Station, Unit 1	0 5 0 0 0 3 5 2	1 OF 0 4

TITLE (4) Actuation of the Reactor Protection System as a result of performing a Surveillance test procedure.

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 2	0 2	9 0	9 0	0 3 0	0 0	0 1	0 2	9 1		0 5 0 0 0
										0 5 0 0 0

OPERATING MODE (9)	4	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)								
POWER LEVEL (10)	0 0 0		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
G. J. Madsen, Regulatory Engineer, Limerick Generating Station	AREA CODE 2 1 5 3 2 7 - 1 2 0 0

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	

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 2, 1990, an actuation of the Reactor Protection System occurred during performance of Surveillance Test (ST) procedure ST-6-001-660-1, "Main Turbine Stop Valve RPS & EOC-RPT Channel Functional Test." The scram signal resulted from main turbine stop valve closure with reactor power simulated to be 30%. There was no control rod motion because the reactor was in cold shutdown with all control rods fully inserted. The cause of the event was an inadequacy in procedure ST-6-001-660-1 that permitted the procedure to be performed while condenser vacuum was at the reset setpoint for the low condenser vacuum main turbine trip. Procedures ST-6-001-660-1 and ST-6-001-660-2 were revised to prevent recurrence.

Unit Conditions Prior to the Event:

Unit 1 Operating Condition was 4 (Cold Shutdown) at 0% power level.

Condenser vacuum was slowly being increased using the mechanical vacuum pump in preparation for reactor startup. Unit 1 Surveillance Test (ST) procedure ST-6-001-660-1, "Main Turbine Stop Valve RPS & EOC-RPT Channel Functional Test," was being performed by Operations personnel and Instrumentation and Controls (I&C) technicians. Procedure ST-2-036-674-1, "Rack 10C026 Instrument Line Backfill Procedure," was also being performed by I&C technicians.

Description of the Event:

On December 2, 1990, utility employed Operations personnel and I&C technicians were performing procedure ST-6-001-660-1 to prove the ability of Main Turbine Stop Valve limit switches to provide proper inputs to the Reactor Protection System (RPS) (EIIS:JC) and the End-of-Cycle Recirculation Pump Trip (EOC-RPT) System (EIIS:AD). The I&C technicians simulated a main turbine first stage pressure signal corresponding to 30% reactor power in the RPS 'A' channel logic in accordance with procedure ST-6-001-660-1. At 2214 hours, an unexpected main turbine trip occurred and all the main turbine stop valves closed. An RPS 'A' logic half-scram signal resulted from the main turbine stop valve closure with reactor power simulated to be 30% or higher in the 'A' channel logic. When the half-scram signal occurred, Main Control Room (MCR) personnel immediately called the I&C technicians performing procedure ST-2-036-674-1 because that procedure contained a caution that scram signals may occur while performing the procedure. The I&C technicians who were performing the instrument line backfill procedure, ST-2-036-674-1, informed the MCR personnel that they had completed valve manipulations and were into the restoration portion of the procedure; therefore, they could not have caused the main turbine trip and half-scram. The control room operators did not immediately identify the cause of the main turbine trip and half scram since the Low Condenser Vacuum trip annunciator was lighted prior to and during the event as condenser vacuum was being increased. Before the MCR personnel could contact the I&C technicians performing procedure ST-6-001-660-1 to inform them that the main turbine trip and half-scram signal had occurred, the I&C technicians continued to perform the procedure by simulating a main turbine first stage pressure signal corresponding to 30% reactor power in the RPS 'B' logic. An RPS 'B' logic half-scram signal occurred at 2216 hours while control room personnel were investigating the cause of the main turbine trip and RPS 'A' logic half-scram signal. This resulted in a full scram signal. There was no control rod movement because all control rods were fully inserted at the time the full scram signal was generated. The reactor recirculation pump EOC-RPT breakers also received a trip signal but the pumps were not running. Operators reset the scram signal four minutes after it was received at 2220 hours and reset the main turbine trip signal 22 minutes after it was received at

2236 hours with condenser vacuum above the trip (22.2 inches Hg vacuum) and reset (23.2 inches Hg vacuum) setpoints. Procedure ST-6-001-660-1 was then resumed.

A four (4) hour notification was made to the NRC at 0144 hours on December 3, 1990, in accordance with the requirements of 10CFR50.72(b)(2)(ii) because this event resulted in automatic actuation of the RPS. This LER is being submitted in accordance with the requirements of 10CFR50.73(a)(2)(iv).

Analysis of the Event:

The reactor was in cold shutdown with all control rods fully inserted. The RPS performed as designed. If procedure ST-6-001-660-1 had been conducted with the reactor at power and the main turbine in operation, this event would not have occurred because the vacuum in the condenser is maintained above the low condenser vacuum main turbine trip and reset setpoints. There was no radiation released as a result of this event.

Cause of the Event:

The cause of this event was an inadequate procedure. Vacuum in the condenser was being increased slowly. At the time of the event, condenser vacuum was at 23.2 inches Hg vacuum. The setpoint for the reset of the pressure switches which initiate the low condenser vacuum main turbine trip is 23.2 plus or minus 0.2 inches Hg vacuum. The trip circuitry is such that six pressure switches (three electrically connected to either side of the trip relay providing a closed circuit) reset when condenser vacuum is increased to 23.2 plus or minus 0.2 inches Hg vacuum. The trip circuitry is in a one out of three taken twice logic arrangement. When all three switches on one side of the trip relay reset, the relay is deenergized which arms the low condenser vacuum main turbine trip circuitry. Because of the sensitivity of the pressure switches and the fact that condenser vacuum was being increased slowly, a spurious closure of one or more of the pressure switches that had just reset occurred. With pressure switches on each side of the trip relay closed, a main turbine trip due to low condenser vacuum occurred. This switch behavior has been observed when condenser vacuum was increased in the past.

A reactor scram occurred because I&C technicians performing ST-6-001-660-1 had simulated first stage main turbine pressure equivalent to 30% reactor power in the RPS at the time of the main turbine trip. These same conditions, main turbine trip with reactor power at 30%, also actuated the EOC-RPT system. ST-6-001-660-1 was inadequate in that it did not contain precautions or prerequisites regarding changes in Main Condenser Vacuum and the potential for a main turbine trip.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Limerick Generating Station, Unit 1	0 5 0 0 0 3 5 2	9 0	— 0 3 0	— 0 0	0 4 OF 0 4

TEXT (If more space is required, use additional NRC Form 366A's) (17)

Corrective Actions:

To prevent recurrence, procedure ST-6-001-660-1 has been revised. A step was added to the prerequisite section stating that if condenser vacuum is being established or increased then condenser vacuum should be greater than 24 inches Hg vacuum prior to starting the procedure since a turbine trip and reactor scram could result due to the sensitivity of the condenser vacuum pressure switches. Unit 2 procedure ST-6-001-660-2 has been similarly revised.

Previous Similar Occurrences:

LER 1-89-032 reported a scram while the reactor was in cold shutdown due to the inadequacy of procedure ST-6-001-765-1, "Main Turbine Control Valve Exercise and RPS Channel Functional Test." The corrective actions of providing clear direction on required plant hardware configuration in main turbine ST procedures performed in multiple operating conditions would not have prevented this event. The plant hardware configuration in this event was correct for performing ST-6-001-660-1.

Tracking Codes: D2- Inadequate procedure - did not cover situation.