10 CFR 50.73

PHILADELPHIA ELECTRIC COMPANY

LIMERICK GENERATING STATION
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J. DOERING, JR.
PLANT MANAGER
LIMERICK GENERATING STATION

December 11, 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 an inadvertent actuation of the Unit 1 Primary Containment and Reactor Vessel Isolation Control System (PCRVICS), an Engineered Safety Feature, which occurred due to spurious operation of a PCRVICS logic relay.

Reference:	Docket No. 50-352
Report Number:	1-91-027
Revision Number:	00
Event Date:	November 12, 1991
Report Date:	December 11, 1991
Facility:	Limerick Generating Station P.O. Box 2300, Sanatoga, PA 19464-2300

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

Very truly yours,

KOS: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) An Engineered Safety Feature actuation due to an unknown cause for an isolation valve associated with a Primary Containment H2/02 Combustible Gas Analyzer.

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)
										0 5 0 0 0
1 1	1 2	9 1	9 1	0 2 7	0 0	1 2	1 1	9 1		0 5 0 0 0

OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
1		20.402(b)	20.405(c)	X 50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10)		20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
1 0 0		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
	AREA CODE
G. J. Madsen, Regulatory Engineer, Limerick Generating Station	2 1 5 3 2 7 - 1 2 0 1 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	
K	I K	R L Y	C 6 1 2	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 November 12, 1991, Main Control Room operators observed the initiation of a spurious actuation of the Primary Containment and Reactor Vessel Isolation Control System (PCRVICS), an Engineered Safety Feature. The initiation resulted in closure of the Primary Containment H2/02 Combustible Gas Analyzer sample lines to the drywell, and an isolation signal to the normally closed Hydrogen Recombiner Inboard Isolation Valves and the Low Flow Nitrogen Makeup isolation valve. The actual consequences of the event were minimal and there was no release of radioactive material to the environment as a result of this event. The proximate cause of the actuation was a relay intermittently changing state; however, the cause of the spurious relay operation could not be determined. The defective relay was replaced. The new relay was tested and the affected equipment was declared operable on November 14, 1991. Bench testing and monitoring of the energized defective relay following replacement identified no problems. Since the testing of the relay revealed no equipment problems and no similar failures have occurred, the failure is considered an isolated event and no further corrective actions are planned.

Unit Conditions Prior to the Event:

Unit 1 was in Operational Condition 1 (Power Operation) operating at 100% power level. There were no structures, systems or components out of service which contributed to this event.

Description of the Event:

On November 12, 1991, during investigatio inment Atmosphere Sampling System (CASS, EIIS:IK) isolation, a second CA: ion occurred which was unrelated to the first event. Both isolations ved actuation of the Primary Containment and Reactor Vessel Isolation Control System (PCRVICS, EIIS:JM) which were Engineered Safety Feature (ESF) actuations. These two events are being reported in separate LERs since they resulted from separate causes. The first event is described in LER 1-91-026. The second event is described below.

On November 12, 1991, at 2104 hours, Main Control Room (MCR) operators observed the initiation of a spurious actuation of a portion of the PCRVICS, an ESF actuation. The isolation resulted in the automatic closure of Primary Containment H2/02 Combustible Gas Analyzer 10S205(CGA, EIIS:BB) sample line isolation solenoid valves SV-57-141, 142, 143, 144, 145, and 159, which are "normally open" PCRVICS valves. This isolation caused CGA 10S205, which monitors the drywell atmosphere, to be inoperable.

Also, the following "normally closed" PCRVICS valves received a signal to close and remained closed.

1. Drywell to 1B Hydrogen Recombiner Inboard Primary Containment Isolation Valve (PCIV), HV-57-163.

2. 1B Hydrogen Recombiner Inboard Exhaust to Suppression Pool PCIV, HV-57-164.

3. Low Flow Nitrogen Make-Up (EIIS:LK) PCIV, HV-57-116.

Immediately after the isolation, the MCR operators placed the CGA 10S205 in "Standby" (which turned off the sample pump) and declared the CGA, the 1B Post LOCA Recombiner, and the PCIV valves described above inoperable. During investigation into the cause of the event, the operators attempted to open the CGA isolation solenoid valves (SVs) and valve HV-57-116, but the valves remained closed. At 2128, with the handswitches for the valves still in the AUTO position, the SVs opened without operator action and the operator verified that valve HV-57-116 would open when operated from the MCR handswitch. The SVs spuriously closed again at 2129 hours and MCR operators placed the SV handswitches in the CLOSE position. The valves then remained in the closed position. The MCR operators entered the ACTION statements for Technical Specifications (TS) Sections 3.3.7.5 (for an inoperable H2/02 CGA), 3.6.3.a.2 (for inoperable PCIVs) and 3.6.6.1 (for an inoperable Post LOCA Hydrogen Recombiner). The appropriate TS ACTIONS were taken within the required times.

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

A four hour notification was made to the NRC at 0044 hours on November 13, 1991, in accordance with the requirements of 10 CFR 50.72(b)(2)(ii) since this event resulted in the automatic actuation of the PCRVICS, an ESF. This LER is being submitted in accordance with the requirements of 10 CFR 50.73(a)(2)(iv).

Analysis of the Event:

The actual consequences of this event were minimal. There was no release of radioactive material to the environment as a result of this event. The Primary Containment H2 and O2 concentrations remained at their normal levels throughout this event. However, the redundant H2/O2 CGA, 10S206 was also isolated on November 12, 1991, from 2104 hours through 2127 hours from an unrelated isolation due to a blown fuse. As a result, both of the Primary Containment H2/O2 CGAs for monitoring the drywell and the suppression pool atmospheres were coincidentally isolated for a period of 23 minutes, well within the time constraints of TS. The TS Action for two inoperable Primary Containment CGAs requires the analyzers to be restored to operable states within 48 hours or be in hot shutdown in the next 12 hours.

The isolation had minimal impact on the ability to perform a low volume purge of the drywell atmosphere during normal or post accident conditions since the isolation signal could have been bypassed in the event that low volume purge of the drywell atmosphere was required.

The isolation also had minimal impact on the ability of the Post-LOCA Recombiner System to operate during post accident conditions since the redundant 1A Post-LOCA Recombiner remained operable throughout the event. Additionally, the isolation signal could have been bypassed and the isolation valves reopened if the 1B Post-LOCA Recombiner was required to be placed in service.

Cause of the Event:

The proximate cause of the PCRVICS actuation was the B21H-K101D relay intermittently changing state; however, the cause of the spurious operation of the B21H-K101D relay coil is unknown. The B21H-K101D relay is an Agastat model EGPI. This relay (and all PCRVICS isolation logic relays) is normally energized.

The B21H-K101D relay has contacts in the "open" control circuit of HV-57-163, 164 and 116, which opened when the relay changed state. These contacts prohibit the valves from opening if an open signal is generated. This caused the valves to be unable to be opened using the MCR handswitch. The B21H-K101D also has contacts in the solenoid power circuit of SV-57-141, 142, 143, 144, 145 and 159. These contacts opened when the relay changed state, which de-energized the normally energized solenoid and caused the SVs to close. The solenoid valves cycled closed and open as the relay changed state.

The defective relay was bench tested by Instrumentation and Control technicians on November 14, 1991, and no problems were identified. The relay was left

energized for several hours, while being monitored by a chart recorder, and no problems were noted.

Corrective Actions:

The defective relay was replaced. The new relay was tested, and the affected equipment was declared operable at 0105 hours on November 14, 1991. Testing of the failed relay revealed no equipment problems and similar failures have not been observed during operation of approximately 2500 Agastat relays at Limerick Generating Station. Additionally, a search of the NPRDS database on failures of Agastat Model EGPI relays from 1987 through 1990 indicated 14 failures due to various causes. An evaluation of these failures by the Instrumentation and Controls Technical Staff has concluded that there is no reason to doubt the reliability of this model relay. Therefore, this failure has been determined to be an isolated event and no actions to prevent recurrence are necessary.

Previous Similar Occurrences:

None

Tracking Codes: X1 - Failure with unknown cause.