10 CFR 50.73

PHILADELPHIA ELECTRIC COMPANY

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

January 22, 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 a condition prohibited by Technical Specifications (TS) in that Primary Containment isolation valves associated with various systems and required for Unit 1 operation were inoperable and the Actions required by TS were not taken in the appropriate time period. This condition was due to inadequate physical electrical separation between cables due to an original installation error.

Reference:	Docket No. 50-352
Report Number:	1-90-035
Revision Number:	00
Discovery Date:	November 29, 1990
Reportability Date:	December 24, 1990
Report Date:	January 22, 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)(i)(B).

Very truly yours,

J. Doering

WGS:rgs

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

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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 5

TITLE (4) This LER reports the inoperability of various Primary Containment Isolation valves as a result of inadequate electrical separation.

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	2 9	9 0	9 0	0 3 5	0 0	0 1	2 2	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)	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)	X 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 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 24, 1990, Limerick Generating Station (LGS) plant personnel determined that fourteen valves associated with various systems and required to perform the function of isolating Primary Containment (PC) were inoperable. These PC isolation valves were determined to be inoperable due to deficiencies in the physical separation between different divisions of Class 1E wires in Unit 1 panels 10C609 and 10C623. The appropriate wiring was subsequently sleeved to comply with separation requirements. We have concluded that this condition, affecting the operability of the above mentioned PC isolation valves, has existed since October 26, 1984, the date of issuance of the Unit 1 Low Power Operating License. This condition resulted from a failure by construction personnel to properly install the wiring during original construction of LGS Unit 1. The consequences of this event were minimal in that no electrical fault condition actually occurred. Corrective actions committed to in LGS Unit 1 LER 1-90-024 are currently being implemented, and will adequately address the concerns associated with the potential for future electrical separation deficiencies. Therefore, no further corrective actions are planned.

Unit Conditions Prior to the Event:

Unit 1 Operating Condition was 1 (Power Operation) at a Power Level of 100%.

There were no other structures, systems or components out of service which contributed to this event.

Description of the Event:

On November 29, 1990, during physical electrical separation panel inspections on Limerick Generating Station (LGS) Unit 1 initiated as a result of LER 1-90-024, potential physical electrical separation deficiencies between different Class 1E (EIIS:ED) electrical division wires were discovered. The deficiencies were located in Unit 1 panels (EIIS:PL) 10C609 and 10C623. These deficiencies were documented on administratively controlled Equipment Trouble Tags (ETT). The ETTs resulted in the generation of a Maintenance Request Form (MRF) to implement corrective actions (sleeving of the appropriate wiring with thermal insulating material) for the affected wiring.

LGS Updated Final Safety Analysis Report (UFSAR), Chapter 8, "Electrical Power," Section 8.1.6.14, states that LGS conforms with the guidance of Regulatory Guide (RG) 1.75, Revision 2, 1978, "Physical Independence of Electrical Systems," and also states that except for specific cases delineated in UFSAR Section 8.1.6.14, a minimum spatial separation distance of six inches will be maintained between Class 1E wiring of one electrical division and Class 1E wiring of a different electrical division unless barriers are installed. The basis for this position is to prevent damage to more than one Class 1E divisional circuit that could result from the propagation of a fault condition in another Class 1E divisional circuit during accident conditions.

We initiated an analysis of the configuration of each of the identified physical electrical separation deficiencies between divisional Class 1E wires. This analysis evaluated the failure of the affected wires during a postulated fault condition to determine whether these wires would droop or sag and result in contact with other wiring such that multiple safety-related systems could be affected. The analysis was completed on December 10, 1990 and plant personnel were informed that specific Class 1E wires in panels 10C609 and 10C623 could not be satisfactorily analyzed due to their physical configuration and could fail if a fault condition occurred.

The inadequately separated wiring was evaluated by LGS plant personnel. This evaluation identified the systems and valves affected. This evaluation was completed on December 24, 1990 and these wiring deficiencies were determined to affect the following list of motor operated valves designed to automatically close and isolate Primary Containment (PC) in the event of an accident.

Unit 1 Panel	System	Valve
10C609	Reactor Enclosure Cooling Water (RECW)	HV-13-108
		HV-13-111
	Drywell Chilled Water (DCW)	HV-87-122
		HV-87-123
		HV-87-128
		HV-87-129
10C623	Main Steam	HV-1F022A,B,C,and D
		HV-1F028A,B,C,and D

Rework (i.e., wrapping of the appropriate wiring with thermal insulated sleeving) was initiated in accordance with a MRF and was completed on December 6, 1990. We have concluded that these electrical separation deficiencies affected the operability of the above mentioned PC isolation valves. Therefore, these Unit 1 PC isolation valves should have been considered inoperable. This condition has existed since October 26, 1984, the date of the issuance of the Unit 1 Low Power Operating License. The "Action" required by Technical Specification (TS) Sections 3.4.7 and 3.6.3 were not taken within the specified time period constituting a condition prohibited by TS. This report is being submitted in accordance with the requirements of 10CFR 50.73(a)(2)(i)(B).

Analysis of the Event:

The consequences of this condition were minimal in that no electrical fault condition occurred which resulted in cable degradation and subsequent interaction. Additionally, the cables used at LGS meet the flame test acceptance criteria of the IEEE-383-1974 Standard and therefore, ignition of cables resulting in electrical interaction or fault propagation is extremely unlikely. There was no release of radioactive material as a result of this event.

In the event that an actual electrical fault condition occurred in the Unit 1 panel 10C609, and the condition affected the Class 1E wires, the following PC isolation valves could fail to close thereby being unable to perform their designed PC isolation function.

- HV-13-108 (Outboard)

- o HV-13-111 (Outboard)
- o HV-87-122 (Inboard)
- o HV-87-123 (Inboard)
- o HV-87-128 (Inboard)
- o HV-87-129 (Inboard)

however, the PC isolation system is designed with redundancy such that for each PC isolation valve listed above, there is an unaffected redundant valve in place to ensure the isolation of the associated PC penetrations. These redundant PC isolation valves ensure that no single failure (i.e., fault condition) in the PC isolation system can prevent the system from performing its intended function.

If an actual electrical fault condition had occurred on the Unit 1 panel 10C609, the fault condition could have potentially affected the ability of an inboard and an outboard main steam isolation valve on the same steam line to automatically close. Therefore, these valves could have failed to perform their designed PC isolation function. However, Main Control Room (MCR) licensed operators would have been able to manually close the affected inboard main steam isolation valve from the MCR, thereby isolating PC.

Additionally, if an actual transient had occurred, MCR operations personnel would have initiated immediate follow up actions to this type of event in accordance with emergency operating procedures. Licensed operators receive requalification training to review and perform operator response to transients of this type. This training provides practice on immediate operator actions and minimizes the length of time certain systems are isolated reducing the impact on the plant. Therefore, as a result of adequate procedural guidance, training, and prompt operator actions, the duration of this type of event would be limited and would have maintained the plant within its design basis.

Cause of the Event:

The cause of this event was an original installation error during the initial construction of Unit 1 in that construction personnel failed to properly install the cabling and the Quality Control (QC) personnel failed to identify this physical separation deficiency.

During Unit 1 construction, panels 10C609 and 10C623 did receive an integrated final physical separation inspection. The installation specification E-1412, which provided instruction to construction personnel on the implementation of divisional physical separation in accordance with the commitments in the UFSAR, was adequate. However, the construction personnel involved did not properly install this cabling. Subsequently, the QC inspector failed to identify these deficiencies during the integrated final physical separation inspections of these panels.

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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)

Corrective Actions:

Based upon the submittal of LGS Unit 1 LER 1-90-024 and associated corrective actions currently being incorporated and implemented, no further corrective actions are planned. These corrective actions are summarized below.

- The Installation Section at LGS has developed and implemented a speciel training program that explains the requirements of electrical separation at LGS and the acceptable methods by which physical separation is maintained. This training is presented to the applicable personnel being processed into the plant for unit refuel outages. In addition, this training was incorporated into the orientation training provided to personnel involved with equipment installations.

- The level of detail and content of the special training program is also being reviewed and appropriately incorporated into existing training programs for other plant personnel having the potential to perform internal panel work.

- Inspections of Unit 1 electrical panels were finished and rework has been completed during the Unit 1 third refuel outage.

The corrective actions referenced in LER 1-90-024 will adequately address the cause of this LER.

Previous Similar Occurrences:

LERs 1-88-037, 1-88-042, 1-89-008, 1-89-009, 1-89-022, and 1-89-025 reported conditions involving physical separation deficiencies which resulted in a system becoming inoperable. These corrective actions could not have prevented this event due to these wire deficiencies existing since original construction of Unit 1. LER 1-90-024 also reported conditions involving physical separation deficiencies. The corrective actions for LER 1-90-024 are currently being implemented and will prevent recurrence.

Tracking Codes: (B) Construction/Installation Deficiency