

PHILADELPHIA ELECTRIC COMPANY

LIMERICK GENERATING STATION
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 SANATOGA, PENNSYLVANIA 19464

(215) 327-1200 EXT. 2000

M. J. McCORMICK, JR., P.E.
 PLANT MANAGER
 LIMERICK GENERATING STATION

December 19, 1990
 Docket No. 50-353
 License No. NPF-85

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

SUBJECT: Licensee Event Report
Limerick Generating Station - Unit 2

This LER reports a condition of the Primary Containment Post-LOCA Radiation Monitoring System where deficient equipment caused 3 channels to become inoperable and the plant to be operated in a condition prohibited by Technical Specifications.

Reference:	Docket No. 50-353
Report Number:	2-90-020
Revision Number:	00
Event Date:	November 19, 1990
Report Date:	December 19, 1990
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,

R.W. Dubiel
 for M. J. McCormick, Jr.

JLP:rgs

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

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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Limerick Generating Station, Unit 2 DOCKET NUMBER (2) 0 5 0 0 0 3 5 3 1 PAGE (3) 1 OF 0 4

TITLE (4)
Deficient Circuit Boards in 3 of 4 Channels of the Primary Containment Post-LOCA Radiation Monitoring System Cause Plant Operation in a Condition Prohibited by Technical Specification

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	1	1990	90	020	00	12	1	1990			0 5 0 0 0
THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following) (11)											

OPERATING MODE (9) <u>1</u>	20.402(b)	20.405(i)	50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10) <u>1 0 0</u>	20.405(a)(1)(ii)	50.36(a)(1)	50.73(a)(2)(v)	73.71(c)
	20.405(a)(1)(iii)	50.36(a)(2)	50.73(a)(2)(vi)	OTHER (Specify in Abstract below and in Text, NRC Form 306A)
	20.405(a)(1)(iv)	X 50.73(a)(2)(i)	50.73(a)(2)(vii)(A)	
	20.405(a)(1)(v)	50.73(a)(2)(ii)	50.73(a)(2)(vii)(B)	
	20.405(a)(1)(vi)	50.73(a)(2)(iii)	50.73(a)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12)

NAME: G. J. Madsen, Regulatory Engineer, Limerick Generating Station

TELEPHONE NUMBER: 2 1 5 3 2 7 - 1 2 1 0

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE) NO

EXPECTED SUBMISSION DATE (15)

MONTH	DAY	YEAR

ABSTRACT (Limit to 1400 characters, i.e., approximately fifteen single-space typewritten lines) (16)

On November 17, 1990, a contractor employed engineer determined that the Primary Containment Post-LOCA Radiation Monitoring System (PCPL-RMS) was inoperable because of a deficient circuit board contained in 3 out of the 4 channels. Instrumentation and Controls technicians obtained a replacement circuit board and installed it into the 'A' channel. With 2 of 4 channels operable, the PCPL-RMS was declared operable at 1850 hours on November 18, 1990, within the 7 day Technical Specifications (TS) Action requirements. Upon further investigation it was determined that the deficient boards had been installed since February, 1989. TS require at least 2 PCPL-RMS channels to be operable with Unit 2 in Operational Conditions 1, 2, and 3. Unit 2 first entered Operational Condition 2 on August 11, 1989. Because the inoperable condition of the PCPL-RMS was not identified until November 17, 1990, the appropriate TS Action statement was not followed between August 11, 1989 and November 17, 1990. The cause of the event was equipment deficient for its application at the Limerick Generating Station. The deficiency would not have prevented the PCPL-RMS from accurately monitoring high containment dose rates. For a low radiation condition concurrent with high containment temperature, 3 of the 4 detectors would be driven downscale causing operator misinformation. The deficient circuit boards were sent to the vendor for correction. The circuit boards are expected to be returned by the vendor and re-installed in the PCPL-RMS by December 31, 1990.

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TEXT IF MORE SPACE IS REQUIRED, USE ADDITIONAL NRC Form 366A (1/77)

Unit Conditions Prior to the Event:

Unit 2 Operating Condition was 1 (Power Operation) at 100% power level.

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

Description of the Event:

In a vendor Quality Assurance (QA) Bulletin issued on June 28, 1990, circuit boards installed in ion-chamber area radiation monitors were identified as having a problem for some applications. Because the Primary Containment Post-LOCA Radiation Monitoring System (PCPL-RMS) (E11S:IK) contains the circuit boards identified by the vendor, an evaluation of their application at the Limerick Generating Station (LGS) was initiated.

After receiving the vendor QA Bulletin in mid-July, the LGS system engineer preformed a preliminary evaluation on its effects. The investigation involved obtaining more detailed information on the circuit board than that provided by the vendor QA Bulletin, identifying the location of the defective circuit boards at LGS, and determining a solution to correct the circuit boards. Corporate engineering, vendor, and Instrumentation and Controls (I&C) personnel were consulted during the course of the investigation. Many discussions on operability were held to affirm that PCPL-RMS operability was not affected by the circuit board problem. The result of the preliminary evaluation was that the problem did not affect PCPL-RMS operability; PCPL-RMS could perform its design function following a Design Basis Loss of Coolant Accident. At the conclusion of the investigation, a Nonconformance Report (NCR) was initiated on November 13, 1990, by the system engineer to document the circuit board problem and correction that needed to be implemented.

On November 16, 1990, a contractor employed engineer who was not involved in the circuit board investigation received the NCR to disposition it. On November 17, 1990, he determined that the PCPL-RMS had circuit boards installed in three of the four detector circuits that may cause the detectors to be driven downscale in radiation fields below 1000R/hr for plant conditions following a small primary system or instrument line pipe break as discussed in Sections 6.2.1.1.3.3.5 and 15.6.2 of the LGS Updated Final Safety Analysis Report. The PCPL-RMS was declared inoperable in accordance with Technical Specifications (TS) Section 3.3.7.5, "Accident Monitoring Instrumentation," at 1430 hours on November 17, 1990. I&C technicians obtained a replacement circuit board and installed it into the 'A' channel. With two out of four channels operable, the PCPL-RMS was declared operable at 1850 hours on November 18, 1990 within the seven day TS Action requirements. Upon further investigation it was determined that the deficient boards had been installed since February, 1989. Unit 2 was first required to comply with TS Section 3.3.7.5 when Operational Condition 2

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TEXT (If more space is required, use additional NRC Form 206A's) (7)

was entered on August 11, 1989. Unit 2 has been in Operational Conditions 1, 2 and 3 much of the time with three inoperable detector channels which exceeds TS Section 3.3.7.5 Action statement resulting in a condition prohibited by TS.

This report is being submitted in accordance with the requirements of 10 CFR 50.73(a)(2)(1)(B) because this event resulted in a condition prohibited by TS.

Analysis of the Event:

During the fifteen months that three defective circuit boards were installed and the PCPL-RMS was not in compliance with TS Section 3.3.7.5, there were no events requiring operators to use PCPL-RMS to monitor the intensity of gross radioactivity inside the containment to determine containment dose rates. The deficiency in the circuit boards would not have prevented the PCPL-RMS from accurately monitoring high containment dose rates. However, during an instrument line pipe break or small primary system line break, accident conditions could cause a low radiation condition concurrent with high containment temperature. Under these accident conditions three of the four PCPL-RMS detectors would be driven downscale causing operator misinformation. If the radiation level subsequently increased, it would be accurately indicated by the defective PCPL-RMS detectors when a high radiation level was reached.

Cause of the Event:

The cause of the event was equipment deficient for its application at LGS due to an inadequate design review. The equipment vendor introduced a new circuit configuration in 1984 to reduce electromagnetic interference (EMI) response at a single, unidentified plant. However, the new circuit was not adequately reviewed by the manufacturer, General Atomic. The new circuit configuration became a part of the standard product line when the manufacturer determined that the new circuit still met the circuit board's fit, form, and function requirements. The field change order issued by the vendor to notify customers of the change was properly controlled by LGS personnel. Not until June 28, 1990, did the vendor recognize that the circuit with EMI reductions will not accurately function under low radiation conditions in conjunction with high temperature conditions.

Corrective Actions:

The equipment vendor has bypassed the EMI reduction circuit on all circuit boards now being manufactured. A replacement circuit board not having the EMI reduction circuit was installed in the 'A' channel on November 18, 1990. On November 20, 1990, the deficient circuit boards were removed from the PCPL-RMS and sent to the vendor for correction. LGS Unit 1 had one defective circuit board that made the channel 'D' of PCPL-RMS inoperable. The defective circuit board was removed and sent with the Unit 2 circuit boards to the vendor for correction. The PCPL-RMS operating history on Unit 1 was reviewed and at no

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time were less than two channels operable. Additionally, there are no additional spare circuit boards at LGS with the EMI reduction circuit.

Because there has been no history of EMI on the PCPL-RMS detector circuits at LGS, installation of circuit boards that do not have the EMI reduction circuit permits accurate functioning under all analyzed accident conditions. The circuit boards are expected to be returned by the vendor and re-installed in the PCPL-RMS by December 31, 1990.

Previous Similar Occurrences:

There has not been a previous failure of PCPL-RMS due to deficient equipment.

Tracking Codes: B17 - Deficient equipment