

## PHILADELPHIA ELECTRIC COMPANY

LIMERICK GENERATING STATION  
 P. O. BOX 4  
 SANATOGA, PENNSYLVANIA 19464  
 (215) 327-1200 EXT. 4300

J. DOERING, JR.  
 PLANT MANAGER  
 LIMERICK GENERATING STATION

December 03, 1991  
 Docket Nos. 50-352  
 50-353  
 License Nos. NPF-39  
 NPF-85

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

SUBJECT: Licensee Event Report  
Limerick Generating Station - Units 1 and 2

This LER reports two manual isolations of the Main Control Room Ventilation system and the actuation of the Control Room Emergency Fresh Air Supply system, both Engineered Safety Features, as required by procedures in response to a high toxic chemical concentration alarm. The cause of these isolations was momentary high toxic chemical concentration indication of an indeterminate nature.

Reference: Docket Nos. 50-352 and 50-353  
 Report Number: 1-91-025  
 Revision Number: 00  
 Event Dates: November 03, 1991  
 November 18, 1991  
 Report Date: December 03, 1990  
 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,

DCS:cah

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 1** DOCKET NUMBER (2) **0 5 0 0 0 3 5 2** PAGE (3) **1 OF 0 4**

TITLE (4) **Main Control Room Isolations in response to a high toxic chemical concentration alarm of an indeterminate nature.**

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	0	3	9	1	9	1	1	2	0	3	5	2	Limerick, Unit 2	0	5	0	0	0	3	5	3

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 50. (Check one or more of the following) (11)

OPERATING MODE (9) <b>1</b>	<input type="checkbox"/> 20.402(b)	<input checked="" type="checkbox"/> 20.405(c)	<input type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 73.71(b)
POWER LEVEL (10) <b>1 0 0</b>	<input type="checkbox"/> 20.405(a)(1)(i)	<input type="checkbox"/> 50.38(c)(1)	<input type="checkbox"/> 50.73(a)(2)(v)	<input type="checkbox"/> 73.71(c)
	<input type="checkbox"/> 20.405(a)(1)(ii)	<input type="checkbox"/> 50.38(c)(2)	<input type="checkbox"/> 50.73(a)(2)(vi)	OTHER (Specify in Abstract below and in Text "NRC" Form 366A)
	<input type="checkbox"/> 20.406(a)(1)(i)	<input type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 50.73(a)(2)(vii)(A)	
	<input type="checkbox"/> 20.405(a)(1)(iii)	<input type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(vii)(B)	
	<input type="checkbox"/> 20.405(a)(1)(iv)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12)

NAME **Gil J. Madsen, Regulatory Engineer, Limerick Generating Station** TELEPHONE NUMBER **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 NRPDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRPDS

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE)  NO

EXPECTED SUBMISSION DATE (15)

MONTH	DAY	YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately 1100 single-space typewritten lines) (16)

On November 3, 1991, and again on November 18, 1991, Main Control Room (MCR) personnel received a MCR annunciator alarm indicating high toxic gas concentration in the MCR fresh air intake. In each instance, MCR personnel then entered Special Event procedure SE-2, "Toxic Gas," donned self-contained breathing apparatus, and manually initiated a MCR ventilation system isolation, an Engineered Safety Feature (ESF). In conjunction with the MCR ventilation system isolation, the Control Room Emergency Fresh Air Supply (CREFAS) system, also an ESF, initiated as designed and provided total recirculation of the MCR air without any fresh air intake from the outside atmosphere. Chemistry personnel were notified and air samples from the MCR were obtained. No toxic gas concentrations were detected. The consequences of these events were minimal in that no toxic gas actually existed. The cause of these events was momentary high toxic chemical concentration indication of an indeterminate nature. Subsequent troubleshooting failed to clarify the exact cause of the high indications. We are investigating several options to decrease the vulnerability of the toxic gas detection system to a single failure or spurious signal to minimize the required MCR isolations.

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		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
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TEXT IF more space is required, use additional NRC Form 266A (1-77)

Unit Conditions Prior to the Event:

Unit 1 and Unit 2 were in Operational Condition 1 (Power Operation) at a 100% Power Level.

The Main Control Room Ventilation System was aligned in its normal operating mode with the fresh air supply from the outside atmosphere. There were no structures, systems, or components out of service which contributed to these events.

Description of the Event:

On November 3, 1991, at approximately 0358 hours, licensed Main Control Room (MCR) personnel received a MCR annunciator alarm indicating that a high toxic gas concentration was detected in the MCR ventilation fresh air intake by the toxic gas detection system (E11S:VI). Licensed MCR operations personnel immediately entered Special Event procedure SE-2, "Toxic Gas," donned self-contained breathing apparatus (SCBA), and manually initiated a MCR ventilation system isolation, an Engineered Safety Feature (ESF). In conjunction with the manual MCR ventilation system isolation, the 'B' train of the Control Room Emergency Fresh Air Supply (CREFAS) system, also an ESF, initiated as designed and provided total recirculation of the MCR air without any fresh air intake from the outside atmosphere. The 'A' train of the CREFAS system remained in the automatic standby mode.

Since the toxic gas concentrations are indicated on a CRT behind the MCR control panels, the toxic gas readings are not immediately available to the MCR operators. Without directly observing the indications at the instant of receipt of the alarm, MCR operators were unable to identify which channel or gas caused the alarm. Shortly after the alarm, MCR operators observed a slightly elevated level of 0.71 ppm of vinyl chloride on the 'B' toxic gas analyzer. No other indications of any elevated levels of toxic gas were observed on the 'A' and 'B' toxic gas analyzers.

Chemistry personnel then donned SCBAs, entered the MCR, and obtained air samples. The results of the air sample analysis indicated that there was no detectable toxic gas concentrations present in the MCR. At 0435 hours, MCR personnel removed their SCBAs. Chemistry personnel verified no toxic gas in the fresh air intake plenum, and the MCR chlorine isolation was reset at 0510 hours.

On November 18, 1991, at approximately 0942 hours, licensed MCR personnel again received a MCR annunciator alarm associated with the toxic gas detection system. Licensed MCR operations personnel again immediately entered procedure SE-2, donned SCBAs, and manually initiated a MCR ventilation system isolation. In conjunction with the manual MCR ventilation system isolation, the 'B' train of the CREFAS System initiated as designed and provided total recirculation of the MCR air without any air intake from the outside atmosphere. The 'A' train of the CREFAS System remained in the automatic standby mode. One of the MCR operators was at the CRT for toxic gas analyzers and observed that the vinyl

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TEXT (if more space is required, see additional NRC Form 366A (1) (1))

chloride concentration indication rose to 11.2 ppm on only the 'B' analyzer and then returned to normal levels. No other indications of any elevated levels of toxic gas were observed on the 'A' and 'B' toxic gas analyzers.

Chemistry personnel then donned SCBAs, entered the MCR, and obtained air samples. The results of the air samples analysis indicated that there was no detectable toxic gas concentrations presented in the MCR. At 10.5 hours, licensed MCR personnel removed their SCBAs. Chemistry personnel verified no toxic gas in the fresh air intake plenum, and the MCR chlorine isolation was reset at 1127 hours.

Four hour notifications to the NRC were made in accordance with the requirements of 10 CFR 50.72(a)(2)(ii) at 0730 hours on November 3, 1991, and at 1229 hours on November 18, 1991, since these events resulted in manual actuations of ESFs. This written report is being submitted in accordance with 10 CFR 50.73(a)(2)(iv).

#### Analysis of the Event:

The consequences of these events were minimal in that no toxic gas actually existed. There was no release of radioactive material to the environment as a result of these events. The MCR ventilation system was isolated, and the 'B' train of CREFAS started and operated as designed during each event. The redundant 'A' train of CREFAS was in the automatic standby mode and was available for operation in the event the 'B' train failed to properly function.

In addition, if an actual concentration of toxic gas had been present, the MCR was properly isolated and would have adequately protected the MCR operators.

#### Cause of the Event:

The cause of these events was a momentary indication of a high toxic gas concentration of an indeterminate nature on the 'B' toxic gas analyzer. Sampling by Chemistry personnel verified that no actual toxic chemical threat existed. Subsequent troubleshooting of the 'B' toxic gas analyzer by Instrumentation and Controls (I&C) personnel failed to clarify the exact cause of the high indications. Following the event on November 18, 1991, I&C personnel retrieved data which verified that the 'B' toxic gas analyzer did indicate a momentary high vinyl chloride concentration. Again, troubleshooting by I&C personnel failed to identify the exact cause of the high indication. During and after both events there were no trouble alarms indicative of equipment failure. We therefore have concluded that on November 3, 1991, similar to the indications observed on November 18, 1991, a momentary high indication occurred above the vinyl chloride alarm setpoint of 9.0 ppm on the 'B' toxic gas analyzer. The indication then dropped back below the alarm setpoint before observation by the MCR operators.

## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
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TEXT IF MORE SPACE IS REQUIRED, USE ADDITIONAL NRC Form 366A (17)

Corrective Actions:

The 'B' toxic gas analyzer was declared inoperable on November 3, 1991. Troubleshooting of the analyzer failed to reveal any problems with the equipment. Surveillance Test (ST) procedure ST-2-078-605-0, "Toxic Gas Detection System Channel 'B' Functional Test," was performed satisfactorily and the system was declared operable again on November 3, 1991.

On November 18, 1991, a similar high toxic gas indication occurred again on the 'B' toxic gas analyzer. The 'B' toxic gas analyzer was again declared inoperable. I&C personnel flushed all sample lines and the analyzer with dry nitrogen to purge any contaminants, and replaced the sample filters. I&C personnel performed various diagnostic tests of the analyzer and detector circuitry and all results were satisfactory. Additionally, I&C personnel recorded on-line real time data and reviewed the results with the vendor/supplier of the toxic gas analyzers. All results were satisfactory. Before the troubleshooting could be completed, the MCR ventilation system was placed in the chlorine isolation mode on November 25, 1991, in accordance with the action of Technical Specifications (TS) Section 3.3.7.8.2, "TOXIC GAS DETECTION SYSTEM." I&C personnel satisfactorily completed a partial performance of procedure ST-2-078-405-0, "Toxic Gas Detection System Channel 'B' Calibration/Functional Test." I&C and operations personnel concluded that the 'B' toxic gas analyzer could satisfactorily perform its design function and on November 29, 1991, the 'B' toxic gas analyzer was declared operable and normal MCR ventilation was restored.

We are currently investigating options to decrease the vulnerability of the toxic gas detection system to a single failure or spurious signal, to minimize the required MCR isolations.

Previous Similar Occurrences:

LER's 85-90, 86-22, 86-28, 88-43, 89-29, and 91-21 reported manual isolations of the MCR ventilation system due to high toxic chemical concentration signals. None of these events occurred as a result of indeterminate high indications except LER 85-90. The exact cause of that event was never determined and no further deficiencies were identified until now, therefore, there were no corrective actions taken which could have prevented this event.

Tracking Code: X1 (Failure with unknown cause)