

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Limerick Generating Station Unit 1										DOCKET NUMBER (2) 0 5 0 0 0 3 5 2 1 OF 0 4										PAGE (3) 1 OF 0 4	
TITLE (4) Inoperability of Fire Protection Water Curtain Systems due to a Design Deficiency Discovered During an Engineering Review																					
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 2	2 9	8 8	8 8	0 0 6	0 0	0 3	3 0	8 8						0 5 0 0 0							
														0 5 0 0 0							
OPERATING CODE (9) 1			THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following): (11)																		
POWER LEVEL (10) 1 0 0			20.402(b)			20.406(a)			80.73(a)(2)(iv)			73.71(b)									
			20.406(a)(1)(i)			80.36(a)(1)			80.73(a)(2)(v)			73.71(a)									
			20.406(a)(1)(ii)			80.36(a)(2)			80.73(a)(2)(vi)			<input checked="" type="checkbox"/> OTHER (Specify in Abstract below and in Text, NRC Form 308A)									
			20.406(a)(1)(iii)			<input checked="" type="checkbox"/> 80.73(a)(2)(i)			80.73(a)(2)(vii)(A)			License Condition 2.C.(3).a									
			20.406(a)(1)(iv)			80.73(a)(2)(ii)			80.73(a)(2)(viii)(B)												
			20.406(a)(1)(v)			80.73(a)(2)(iii)			80.73(a)(2)(ix)												
LICENSEE CONTACT FOR THIS LER (12)																					
NAME Charles A. Mengers, Senior Engineer, Licensing Section										TELEPHONE NUMBER AREA CODE 2 1 5 8 4 1 - 5 1 8 4											
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)												EXPECTED SUBMISSION DATE (15)		MONTH	DAY	YEAR					
YES (If yes, complete EXPECTED SUBMISSION DATE)												<input checked="" type="checkbox"/> NO									

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

Abstract:

On February 29, 1988 at 1635 hours, three fire protection systems required by Technical Specifications and License Condition 2.C.(3).a were declared administratively inoperable due to design deficiencies discovered during an engineering review. Specifically, it was calculated that three fire protection system water curtains were unable to achieve a discharge density of 0.30 GPM/Ft² at floor level as required by the Limerick Final Safety Analysis Report and the Fire Protection Evaluation Report. There were no adverse consequences and no release of radioactive material as a result of this event. The cause of this event was a deficiency in the application of the design assumptions by the fire protection sprinkler contractor. The existing deficient water curtain piping and nozzles are currently being redesigned and modified to meet the required coverage. A previous review of selected calculations of the sprinkler contractor made during modification work has not revealed any significant design deficiencies, however, a sample of other LGS fire protection systems designed by the sprinkler contractor will be reviewed to provide assurance that the deficiency is an isolated case. This review will be completed by April 8, 1988.

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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

APPROVED OMB NO. 3150-0104

EXPIRES 8/31/95

FACILITY NAME (1) Limerick Generating Station Unit 1	DOCKET NUMBER (2) 05000352	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
		88	006	00	02	OF	04

TEXT (If more space is required, use additional NRC Form 365A's) (17)

Unit Conditions Prior to the Event:

Operating Mode - 1 (Power Operation)

Reactor Power - 100%

Description of the Event:

On February 29, 1988 at 1635 hours, three fire protection systems which are required by Technical Specifications and License Condition 2.C.(3).a were declared administratively inoperable due to design deficiencies.

During a Nuclear Engineering review of two Licensing Document Change Notices (LDCN) a nonconformance with the requirements of the Limerick Generating Station Final Safety Analysis Report (FSAR) and of the Fire Protection Evaluation Report (FPER) was identified for three Unit 1 Reactor Enclosure water curtain systems.

These systems provide water curtain separation between redundant trains of safe shutdown components located within the same fire area as required by 10 CFR 50 Appendix R Section II.G.2.b and NRC Generic Letter 83-33. The systems are required to be operable in accordance with Technical Specification Section 3.7.6.2.

License Condition 2.C.(3).a states that "The licensee shall maintain in effect all provisions of the approved fire protection program as described in the Final Safety Analysis Report...". FSAR Section No. 9.5.1.2.3 and FPER Section No. 2.10 state that the systems are designed to "achieve a discharge density of 0.30 GPM/Ft² at floor level." Contrary to the commitment, calculations show that the three water curtain systems are only capable of delivering the following average densities at the floor level:

<u>System No.</u>	<u>Average Delivered Density</u>
DL-69	0.13 GPM/Ft ²
DL-70	0.18 GPM/Ft ²
DL-71	0.21 GPM/Ft ²

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

EXPIRES 8/31/85

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TEXT (If more space is required, use additional NRC Form 365A's) (17)

Consequences of the Event:

There were no adverse consequences as a result of this event. There was no release of radioactive material as a result of this event.

The water curtains are a manually actuated system which in conjunction with combustible free zones between equipment and encapsulation of components with fire retardant material will mitigate the consequences of a fire spreading between redundant trains of safe shutdown equipment. The fire protection water curtain systems, which were declared inoperable due to design deficiencies, have never been called upon to perform their design function. Had a fire occurred, with the stated deficiencies of the water curtains present, the fire brigade personnel would respond to the alarm and follow fire fighting (F) procedures which would determine their actions taken during the progression of a fire. Had the need arisen to manually actuate the water curtain system and it was observed to not be performing its function the fire brigade members would have access to fire hoses in the area which could be used to augment the water curtain system.

Cause of the Event:

The cause of this event was a deficiency in the application of the design assumptions by the sprinkler contractor.

In summary, the system configuration was insufficient to deliver the stated design density over the area of application. Industry standards (NFPA 13) and good engineering practices require the area of application be located at floor level. The contractor's design considered the area of application to be near the ceiling, just below the nozzles.

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TEXT (If more space is required, use additional NRC Form 365A k) (17)

Corrective Actions:

Immediately following the discovery a continuous firewatch was posted and additional fire hoses were made available in the area of the inoperable water curtains.

Actions Taken to Prevent Recurrence:

The water curtain configurations identified as deficient through this event will be redesigned by 4/18/88. The actual piping and nozzles will then be modified to deliver the design density.

A previous review of selected calculations of the sprinkler contractor made during modification work has not revealed any significant design deficiencies; however, a representative sample of other Technical Specification LGS fire protection systems designed by the sprinkler contractor will be reviewed to provide assurance that this identified deficiency is an isolated case. This evaluation is scheduled to be completed by 4/8/88.

EIIS Codes: KP - Fire Protection System
NZL - Nozzle

Previous Similar Occurrences:

While several LERs have reported deficiencies with fire protection penetration seals, none have reported a design deficiency with fire protection spray/water curtain piping design.

Tracking Code - B99 - Design deficient (other)
Design Inadequate and not in
keeping with Industry Standards
and good Engineering Practices

PHILADELPHIA ELECTRIC COMPANY

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March 30, 1988

Docket No. 50-352

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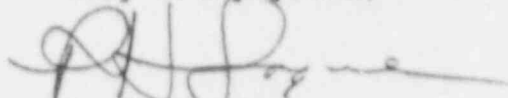
SUBJECT: Licensee Event Report
Limerick Generating Station - Unit 1

This LER reports the Inoperability of Fire Protection Water Curtain Systems due to a design deficiency discovered during an engineering review. This LER also serves as the reporting vehicle for a violation of License Condition 2.C.(3).a.

Reference:	Docket No. 50-352
Report Number:	88-006
Revision Number:	00
Event Date:	February 29, 1988
Report Date:	March 30, 1988
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. H. Logue
Assistant to the Manager
Nuclear Support Department

cc: W. T. Russell, Administrator, Region I, USNRC
T. J. Kenny, Senior Resident Inspector

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