



PECO ENERGY

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10CFR 50.73

February 09, 1994  
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 Engineered Safety Feature actuations after a manual isolation of the Unit 1 Reactor Enclosure Secondary Containment was performed causing the common plant Standby Gas Treatment System and the Unit 1 Reactor Enclosure Recirculation System to automatically start. The primary cause of this event was equipment problems encountered with the Auxiliary Boiler system.

Reference:	Docket Nos. 50-352 50-353
Report Number:	1-94-002
Revision Number:	00
Event Date:	January 16, 1994
Report Date:	February 09, 1994
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,

DMS:cah

cc: T. T. Martin, Administrator Region I, USNRC  
N. S. Perry, 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) Manual isolation of the Reactor Enclosure Secondary Containment, an Engineered Safety Feature Actuation, due to equipment problems encountered with the Auxiliary Boiler system.																																																																					
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OPERATING MODE (9) 2										THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more of the following) (11)										DOCKET NUMBER (5) 0 5 0 0 0 3 5 3																																																	
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NAME J. L. Kantner, Manager - Experience Assessment, LGS																				TELEPHONE NUMBER 6 1 0 3 2 7 - 1 2 0 0																																																	
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																																																																					
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ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)																																																																					

On 1/16/94, at 0030 a manual isolation of the Unit 1 Reactor Enclosure (RE) Secondary Containment (SC), an Engineered Safety Feature (ESF) actuation, was inserted due to a low differential pressure (dp) condition between the RE SC and the outside environment. Following the isolation, the Standby Gas Treatment System and the Reactor Enclosure Recirculation System, also ESFs, started per design. On 1/15/94, at 2343 the 'A' Auxiliary Boiler tripped on low steam drum water level due to a frozen instrument line. As a consequence of the frozen instrument line, a second Auxiliary Boiler also tripped. This resulted in a loss of steam to the RE ventilation system heating coils, causing the RE exhaust fans to be unable to extract enough air to maintain the negative dp. The RE SC isolation signal was inserted after operators concluded that the one operating Auxiliary Boiler could not provide sufficient steam to maintain the RE dp. The isolation was reset at 1650 on 1/16/94, after the frozen instrument line was repaired, and the RE ventilation system was restarted. The consequences of this event were minimal. An inspection of areas of the Auxiliary Boiler system susceptible to freezing was performed, and repairs were implemented.

## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

EXPIRES: 8/31/85

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
Limerick Generating Station, Unit 1	0 5 0 0 0 3 5 2 9 4	—	0 0 2	—	0 0	0 2 OF 0 4

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

Unit Conditions Prior to the Event:

Unit 1 was in Operational Condition (OPCON) 2 (Startup) at 950 psig, and Unit 2 was in OPCON 1 (Power Operation) at 100% power at the time of this event.

Prior to the event, the 'A' and 'C' Auxiliary Boilers (EIIS:SA) were operating in manual at a fixed firing rate each producing a constant steam flow. The 'B' Auxiliary Boiler was operating in automatic, and following the plant heating steam load demand. The 'C' Auxiliary Boiler feedwater/level controls were experiencing a slow response from the boiler steam drum water level controller due to a faulty steam flow sensing element.

Description of the Event:

On January 16, 1994, at 0030 hours, a manual isolation of the Unit 1 Reactor Enclosure (RE) Secondary Containment (SC), an Engineered Safety Feature (ESF) actuation, was performed by Operations personnel per approved procedures due to a low differential pressure (dp) condition which existed between the RE SC and the outside atmosphere. During normal RE Heating, Ventilation, and Air Conditioning (HVAC) system (EIIS:VA) operation, the RE to the outside air dp is maintained at the Technical Specifications (TS) required negative pressure of greater than or equal to 0.25 inches of water gauge. Following the manual insertion of the isolation signal, the common plant Standby Gas Treatment System (SGTS) (EIIS:BH) and the Unit 1 Reactor Enclosure Recirculation System (RERS) (EIIS:AD), also ESFs, automatically started per design to restore the RE SC dp to the required TS negative 0.25 inches of water gauge.

The low RE SC dp was the result of a loss of steam to the RE HVAC system heating coils. Equipment problems with the Auxiliary Boilers and a heavy steam demand resulted in inadequate heating of the RE HVAC system supply air. The cold air entering the RE was heated by the residual RE air, expanded, and resulted in an increase in RE pressure such that the RE exhaust fans could not adequately control the RE dp to the normal negative 0.25 inches of water gauge dp.

Operations personnel concluded that the Auxiliary Boiler heating steam system could not be restored within the fifty minute RE SC low dp isolation time delay, and inserted the RE SC isolation signal. Repairs to the Auxiliary Boilers were completed, and the steam supply to the RE HVAC system heating coils was re-established. On January 16, 1994, at 1650 hours, the RE SC isolation signal was reset, and the normal RE HVAC system operation was restored.

## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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

A four hour notification was made to the NRC on January 16, 1994, at 0356 hours, pursuant to the requirements of 10CFR50.72(b)(2)(ii) since this event resulted in a manual and automatic ESF actuations. This report is being submitted in accordance with the requirements of 10CFR50.73(a)(2)(iv).

Analysis:

There were no adverse consequences and no radioactive material was released to the environment as a result of this event. The RE SC isolation system and the SGTs and RERS responded as designed following the receipt of the RE SC low negative dp condition and the manual RE SC isolation signal.

Cause of the Event:

The cause of this event was equipment malfunctions of the Auxiliary Boilers resulting in a loss of steam to the RE HVAC system heating coils. On January 15, 1993, at 2343 hours, the 'A' Auxiliary Boiler tripped due to a frozen feedwater flow sensing line. The line became frozen when a small packing leak developed on a valve resulting in water entering the insulation covering. Extremely low ambient temperatures resulted in the inability of the heat tracing to prevent the water soaked insulation from freezing. Consequently, the feedwater sensing line froze, causing the 'A' Auxiliary Boiler to trip on low steam drum water level. Additionally, as a consequence of the frozen feedwater sensing line, the feedwater makeup valve to the 'A' Auxiliary Boiler went fully open causing inadequate feedwater supply pressure to the 'B' and 'C' Auxiliary Boilers.

Following the 'A' Auxiliary Boiler trip, the steam demand on the 'B' and 'C' Auxiliary Boilers increased. The combination of the inadequate feedwater supply pressure and the slow response of the 'C' Auxiliary Boiler feedwater level controls caused the 'C' Auxiliary Boiler to trip on low steam drum water level. The 'B' Auxiliary Boiler remained in automatic operation; however, the boiler was unable to maintain the high steam demand. In accordance with system operating procedures to preserve the steam header pressure, Operations personnel manually throttled the heating steam supply pressure control valve to maintain sufficient atomizing steam for the restart of the 'A' and 'C' Auxiliary Boilers. Throttling the control valve reduced steam to the RE HVAC system heating coils, resulting in a low negative dp condition within the RE. After several attempts, Operations personnel were unable to restart the 'A' and 'C' Auxiliary Boilers, and concluded that a manual isolation of the RE SC was necessary.



## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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

Corrective Actions:

1. The sensing line was thawed allowing proper dp to be measured across the 'A' Auxiliary Boiler feedwater flow element, FE-021-010A. The packing leak which allowed water to enter the sensing line insulation was repaired and a new covering for the insulation installed to prevent water infiltration.
2. An inspection of other areas of the Auxiliary Boiler system that are susceptible to freezing was performed. Permanent coverings were installed and repairs were made on other potential low temperature sensitive Auxiliary Boiler instrument lines.
3. The 'C' Auxiliary Boiler drum level controller system was analyzed by the system manager, and a faulty steam flow sensing element was identified. This unique problem was assessed to not limit normal boiler operation, and the element will be repaired or replaced during the next scheduled Auxiliary Boiler outage.

Previous Similar Occurrences:

LERs 1-85-089, 1-87-001, 1-87-056, 1-87-058, 1-87-064, and 1-87-065 reported RE SC isolations due to a loss of Auxiliary Boiler system steam. The causes of these previous events were different than the causes of the event reported in this LER. Therefore, the corrective actions for these previous events would not have prevented this event from occurring.