

PHILADELPHIA ELECTRIC COMPANY

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J. DOERING, JR.
 PLANT MANAGER
 LIMERICK GENERATING STATION

February 6, 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 the required TS ACTION for Reactor Enclosure Secondary Containment Integrity was not met within the required time period, and reports a condition that alone could have prevented the fulfillment of the safety function of structures or systems that are needed to control the release of radioactive material.

Reference: Docket No. 50-352
 Report Number: 1-91-001
 Revision Number: 00
 Event Date: January 8, 1991
 Report Date: February 6, 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) and 10 CFR 50.73 (a)(2)(v)(C).

Very truly yours,

DMS:can

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 1** PAGE (3) **OF 0 6**

TITLE (4) **Loss of Reactor Enclosure Secondary Containment Integrity due to a Reactor Enclosure Overpressurization Transient causing a Blowout Panel to Actuate.**

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	1	0	8	9	1	9	1	0	0	1	0	0	0	2	0	6	9	1	0	5	0	0	0

OPERATING MODE (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	<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.405(c)	<input type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 73.71(b)
	<input type="checkbox"/> 20.405(a)(1)(i)	<input type="checkbox"/> 50.36(a)(1)	<input checked="" type="checkbox"/> 50.73(a)(2)(v)	<input type="checkbox"/> 73.71(c)
	<input type="checkbox"/> 20.405(a)(1)(ii)	<input type="checkbox"/> 50.3.(c)(2)	<input type="checkbox"/> 50.73(a)(2)(vi)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
	<input type="checkbox"/> 20.405(a)(1)(iii)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 50.73(a)(2)(vii)(A)	
	<input type="checkbox"/> 20.405(a)(1)(iv)	<input type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(vii)(B)	
	<input type="checkbox"/> 20.405(a)(1)(v)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(x)	

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 0 0**

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRRS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRRS

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 fifteen single-space typewritten lines) (16)

On 01/07/91, at 1545 hours, while placing the normal Reactor Enclosure (RE) Heating, Ventilation, and Air Conditioning (HVAC) system in operation, three of the four operating RE HVAC supply and exhaust air fans tripped. However, the 'A' RE HVAC supply air fan continued to operate, resulting in a RE high positive air pressure condition. The power supply breaker for the 'A' RE HVAC supply air fan was manually tripped and the fan then shutdown. At 1630 hours, operations personnel restarted the RE HVAC system, however, the system experienced difficulty in maintaining the RE negative differential pressure. The third RE HVAC exhaust air fan was placed in operation and RE negative differential pressure was reestablished. At 1900 hours, an open RE blowout panel was discovered. The Technical Specifications (TS) ACTION for loss of RE Secondary Containment Integrity (SCI) was entered and required restoring RE SCI or to complete a plant shutdown by 1100 hours on 01/08/91. On 01/08/91, at 0920 hours, reinstallation of the blowout panel was complete and RE SCI was restored. Following this event on 01/08/91, plant personnel determined that RE SCI actually became inoperable at 1545 hours and not at 1900 hours, which required the plant to be in Hot Shutdown by 0745 hours on 01/08/91. Therefore, the TS ACTION had not been met within the required time period. There was no radioactive release as a result of this event. The cause of the RE HVAC system problems was due to equipment failures. The equipment failures are being evaluated and this event will be discussed at operator training.

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TEXT (If more space is required, use additional NRC Form 366A s) (17)

Unit Conditions Prior to the Event:

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

Prior to 1545 hours on January 7, 1991, the Standby Gas Treatment System (SGTS) (EIIS:BH) and the Unit 1 Reactor Enclosure Recirculation System (RERS) (EIIS:AD) were operating and operations personnel were in the process of aligning the Unit 1 Reactor Enclosure Heating, Ventilation, and Air Conditioning (RE HVAC) system for normal operation. This was being performed in conjunction with the performance of the monthly Surveillance Test (ST) Procedure, ST-6-076-250-1, "SGTS and RERS Flow Test," and following maintenance activities to replace the RE HVAC supply air fan's intake filters. Alignment and startup of the RE HVAC system is described as follows.

System (S) Procedure S76.1.B, "Startup of the Reactor Enclosure HVAC System," instructs the operators to select two of three RE HVAC supply air fans and place their respective handswitches to the RUN position. The two selected supply air fans will not start until they receive a start permissive from the RE HVAC exhaust air fan logic circuitry indicating that two RE HVAC exhaust air fans and one Reactor Enclosure Equipment Compartment Exhaust (REECE) air fan are operating. The RE HVAC supply air fans will trip off if two of the three RE HVAC exhaust air fans stop operating and their respective power supply breakers trip open.

Description of the Event:

On January 7, 1991, at 1545 hours, operations personnel shutdown the SGTS and the RERS in accordance with procedure ST-6-076-250-1, to allow for the startup of the normal RE HVAC system per procedure S76.1.B. During this operation, the RE to outside air differential pressure is 0.0 inches of water gauge and RE Secondary Containment Integrity (SCI) is not operable until the required differential pressure of negative 0.25 inches of water gauge is re-established with operation of either the normal RE HVAC system or the SGTS. Moments after the RE HVAC system was placed in operation, three of the four operating RE HVAC supply and exhaust air fans tripped; however, the 'A' RE HVAC supply air fan continued to operate after receiving this trip signal. This resulted in a high positive air pressure condition in the RE. Operations personnel immediately placed the 'A' RE HVAC supply air fan handswitch to the off position; however, the fan continued to operate. At approximately 1604 hours, operations personnel manually tripped the power supply breaker for the 'A' RE HVAC supply air fan, and the fan then shutdown. Inspection of the power supply breaker revealed that the trip coil had malfunctioned and burned preventing the 'A' RE HVAC supply air fan from automatically tripping. Inspection of the RE HVAC exhaust air fans revealed that their discharge dampers did not fully open within their required design time period causing the RE HVAC exhaust air fans to trip. The dampers and their linkages were inspected and several worn damper blade shaft bearings were identified.

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At 1630 hours, operations personnel started the RE HVAC system utilizing the remaining two operable supply air fans; however, the system experienced difficulty in maintaining the required differential pressure of negative 0.25 inches of water gauge for the RE. Since the RE HVAC system had been secured for approximately six (6) hours prior to this event, the RE area air temperatures had increased. With outside air ambient temperature at twenty-five (25) degrees Fahrenheit, plant personnel concluded that the difficulty in maintaining a negative differential pressure was attributed to the expansion of the cool supply air entering the RE. Fluctuations in RE differential pressure caused by cool air entering the RE is a transient previously experienced during the winter months.

At approximately 1635 hours, operations personnel placed the third RE HVAC exhaust air fan in operation and normal RE negative differential pressure was established. At this time, plant personnel considered that RE SCI was established and was being maintained with the required negative differential pressure. However, as a precaution, due to this abnormal RE HVAC system alignment, the shift supervisor initiated procedure ST-6-076-360-1, "Reactor Enclosure Secondary Containment Integrity Verification," to ensure that all RE blowout panels were properly sealed and closed. Since a number of the blowout panels are located in contaminated areas of the RE, the performance of the ST procedure was delayed until proper authorization (i.e., Radiation Work Permit (RWP)) to enter these areas could be obtained.

On January 7, 1991, at 1900 hours, during a routine walkdown of the RE, security personnel notified operations personnel that a fifteen (15) foot by thirteen (13) foot blowout panel had actuated and opened. Operations personnel initiated Off Normal (ON) Procedure ON-111, "Loss of Secondary Containment." Maintenance personnel were notified to begin reinstallation of the open blowout panel, and Health Physics (HP) personnel were contacted to survey and monitor the blowout panel area for evidence of radioactive material contamination. Additionally, the four (4) hour ACTION for Technical Specifications (TS) Section 3.6.5.1.1, "Reactor Enclosure Secondary Containment Integrity," was entered at 1900 hours, the time the open blowout panel was identified. The ACTION for TS 3.6.5.1.1 is as follows.

"Without REACTOR ENCLOSURE SECONDARY CONTAINMENT INTEGRITY, restore REACTOR ENCLOSURE SECONDARY CONTAINMENT INTEGRITY within four (4) hours or be in at least HOT SHUTDOWN within the next twelve (12) hours and in COLD SHUTDOWN within the following twenty-four (24) hours."

At 2300 hours, with the blowout panel reinstallation work incomplete, operations personnel began a controlled plant shutdown as required by the ACTION for TS 3.6.5.1.1. This TS ACTION required operations personnel to have the plant in Hot Shutdown by 1100 hours, on January 8, 1991, if RE SCI could not be restored. A one hour notification was made to the NRC at 2350 hours on January 7, 1991, in accordance with 10CFR50.72(b)(1)(i)(A) since the event resulted in an initiation of a plant shutdown required by TS.

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With the blowout panel re-installed at 0757 hours, on January 8, 1991, plant personnel removed the RE HVAC system from operation and initiated procedure S76.8.B, "Manual Initiation of Reactor Enclosure or Refueling Floor Secondary Containment Isolation," for the operation of the SGTS and the RERS to monitor RE air leakage. During performance of the procedure, instrumentation indicated that RE air leakage was above the TS Limit of 1250 cubic feet per minute (CFM), and maintenance repair work continued on the blowout panel until RE air leakage dropped below the TS limit. Concurrently, with the repairs to the blowout panel, the remaining RE blowout panels were inspected and no significant leakage or problems were identified. At 0920 hours on January 8, 1991, RE SCI was restored, thereby satisfying the Action of TS section 3.6.5.1.1, and precluding a complete plant shutdown.

Following this event, plant personnel re-evaluated the actual time at which RE SCI became inoperable. Discussions with plant personnel, and reviews of the Main Control Room (MCR) log books and RE differential pressure computer data, revealed that the blowout panel had probably actuated sometime between 1545 hours when the SGTS and the RERS were secured for startup of the RE HVAC system, and 1604 hours when the RE HVAC supply air fan was manually tripped. The four (4) hour ACTION for TS section 3.6.5.1.1, to restore the RE SCI, actually began at 1545 hours and not at 1900 hours when security personnel discovered the open blowout panel. The RE SCI was inoperable starting at 1545 hours due to the lack of negative differential pressure with the SGTS and normal RE HVAC system out of service, and then later when the blowout panel opened. Additionally, the twelve (12) hour ACTION for TS section 3.6.5.1.1 to initiate a plant shutdown actually began at 1945 hours on January 7, 1991, with the plant to be in Hot Shutdown by 0745 hours on January 8, 1991.

This LER is being submitted in accordance with the requirements of 10CFR50.73(a)(2)(i)(B) since the ACTION for TS section 3.6.5.1.1 had not been met within the required time period resulting in a condition prohibited by TS. During further evaluation of this event, it was determined that this event is also reportable in accordance with 10CFR50.72(b)(2)(iii)(C) and 10CFR50.73(a)(2)(v)(C), since it resulted in a condition that alone could have prevented the fulfillment and the safety function of structures or systems that are needed to control the release of radioactive material. The one hour notification that was made to the NRC on January 7, 1991, covers the four hour notification required by this additional reporting requirement.

Analysis of the Event:

HP personnel were notified after the discovery of the actuated blowout panel. The results of their surveys and monitoring indicated that no detectable radioactive material existed in the area and no radioactive material was released to the environment during the time period in which the blowout panel was open. Therefore, the actual consequences of this event were minimal.

If an accident condition had occurred with the blowout panel open, the RE negative differential pressure would not have been maintained by the SGTS and

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the RERS. Therefore, if the accident resulted in a radioactive release within the RE, an unmonitored release of radioactive material to the environment could have occurred as a result of the open blowout panel. In response to this type of accident, the operators would have initiated Transient Response Implementing Plan (TRIP) Procedure, T-104, "Radioactivity Release Control," which provides direction for mitigating the release of radioactivity. Licensed operators receive requalification training to review and practice responses to simulated plant transients of this type. The procedure, training, and operator actions would have mitigated the consequences of this type of accident.

Cause of the Event:

The cause of the RE overpressurization was the failure of the RE HVAC exhaust air fan discharge dampers to open fully within their required design time period, in conjunction with the 'A' RE HVAC supply air fan power supply breaker trip coil that malfunctioned and burned. The RE HVAC exhaust air fan discharge dampers did not open properly due to several worn damper blade shaft bearings.

The cause for not identifying the open blowout panel prior to 1900 hours, was that a negative RE differential pressure was re-established at 1635 hours, and plant personnel incorrectly concluded that the cool air entering the RE was the cause of the RE differential problem. Fluctuations in RE differential pressure caused by cool air entering the RE is a transient previously experienced during the winter months. Therefore, immediate inspection of the RE blowout panels and penetrations was not performed.

Corrective Actions:

1. The 'A' RE HVAC supply air fan power supply breaker trip coil was replaced and tested on January 10, 1991.
2. An evaluation of the trip coil failure will be performed, and the results of this evaluation will be used to determine if a method to identify a potential trip coil deficiency prior to its failure can be developed. Additionally, appropriate procedures will be revised or written if necessary, as determined by the evaluation. This item is expected to be completed by May 31, 1991.
3. Maintenance work requests were issued on January 10, 1991, to inspect, overhaul, and lubricate the RE HVAC exhaust air fans discharge dampers. This work is expected to be performed at the next possible RE HVAC system outage of adequate duration.
4. An evaluation of the RE HVAC exhaust air fan discharge damper blade shaft bearing wear will be performed. Appropriate actions will be implemented if necessary, as determined by the evaluation. This item is expected to be completed by May 31, 1991.

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5. This event will be addressed in both Licensed and non-Licensed operator continuing training. The discussion of this event will emphasize to operations personnel that a RE overpressurization transient can result in the actuation of a blowout panel and initiation of the procedure, ST-6-076-360-1, to inspect the RE blowout panels and penetrations, should be considered. This training is expected to be completed by May 20, 1991.

In addition to the operator training on this event and the corrective actions stated above, the following procedural enhancements will be implemented to formalize the actions taken by operations personnel during this event, and to provide guidance to operations personnel if a similar event occurs. These enhancements are as follows.

- A. The Units 1 and 2 RE HVAC system operation procedures will be revised to include procedural steps that direct operators to consider initiation of procedure, ST-6-076-360-1, to inspect the RE blowout panels and penetrations if the "REAC ENCL HIGH DELTA P" annunciator alarms on either local RE HVAC system control Panels 10C206 or 20C206. Presently, the ST procedure is performed on a frequency of every thirty-one (31) days or at the discretion of plant personnel. These revisions are expected to be implemented by February 28, 1991.
- B. The Alarm Response Cards for the Units 1 and 2 "REAC ENCL HIGH DELTA P" annunciators will be revised to direct operators to consider initiation of procedure, ST-6-076-360-1, for inspection of the RE blowout panels and penetrations, if either alarm annunciates. These revisions are expected to be implemented by March 29, 1991.

Previous Similar Occurrences:

LGS LER 2-90-011 reported the Loss of Unit 2 Secondary Containment Integrity due to a severed instrument air line to the RE HVAC exhaust air fan's blade pitch controller. The RE HVAC system failed to maintain normal RE differential pressure causing a blowout panel to actuate. However, the blowout panel actuated prematurely, and the RE high differential pressure setpoint was not exceeded. The cause of LER 2-90-011 is unrelated to the cause of the event being reported in this LER. Therefore, the corrective actions from LER 2-90-011 would not have prevented this event from occurring.

Tracking Codes: B17 Deficient equipment