NRC Form 366 (9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/88

# LICENSEE EVENT REPORT (LER)

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

TITLE (4) Reactor Enclosure Isolation on Low Differential Pressure Due to Reactor Enclosure Supply Fans Tripping on Low Supply Air Temperature

| 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 2 | 3 1 | 8 7 | 8 7 | — | 0 7 0 | — 0 0 | 0 1 | 2 9 | 8 8 | | 0 5 0 0 0 |
| | | | | | | | | | | | 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 | 20.402(b) | 20.405(c) | X 50.73(a)(2)(iv) | 73.71(b) |
| | | 20.405(a)(1)(i) | 50.36(c)(1) | 50.73(a)(2)(v) | 73.71(c) |
| | | 20.405(a)(1)(ii) | 50.36(c)(2) | 50.73(a)(2)(vii) | OTHER (Specify in Abstract below and in Text, NRC Form 366A) |
| | | 20.405(a)(1)(iii) | 50.73(a)(2)(i) | 50.73(a)(2)(viii)(A) | |
| | | 20.405(a)(1)(iv) | 50.73(a)(2)(ii) | 50.73(a)(2)(viii)(B) | |
| | | 20.405(a)(1)(v) | 50.73(a)(2)(iii) | 50.73(a)(2)(x) | |

LICENSEE CONTACT FOR THIS LER (12)

| NAME | TELEPHONE NUMBER |
|---|---|
| Charles A. Mengers, Senior Engineer, Licensing Section | 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 NPRDS | | CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO NPRDS | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | |
| | | | | | | | | | | | |

| SUPPLEMENTAL REPORT EXPECTED (14) | | EXPECTED SUBMISSION DATE (15) | MONTH | DAY | YEAR |
|---|---|---|---|---|---|
| YES (If yes, complete EXPECTED SUBMISSION DATE) | X NO | | | | |

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


Abstract: 87-070

On December 31, 1987 at 0021 hours, an isolation of the Reactor Enclosure Secondary Containment occurred on low Reactor Enclosure to outside atmosphere differential pressure. The Standby Gas Treatment System (SGTS) and Reactor Enclosure Recirculation System (RERS), Engineered Safety Features, initiated as designed and Nuclear Steam Supply Shutdown System (NSSSS) Group VIA and B isolation signals were received. Following initiation of the SGTS, the 'B' SGTS fan tripped due to its flow monitoring switch drifting out of calibration and the 'A' fan automatically started and continued to operate as designed. The isolation was reset at 0132 hours. There were no adverse consequences and there was no release of radioactive material as a result of this event. Stratification of cold air around the temperature sensing element in the Reactor Enclosure Supply intake plenum caused temperature switch (TSL-076-105) to trip the Reactor Enclosure supply fans which resulted in the isolation on low differential pressure. A temporary circuit alteration was implemented on December 31, 1987 to bypass the temperature switch's Reactor Enclosure supply fan tripping logic to prevent further isolations. Maintenance Request Forms will be implemented during the next outage to replace the positioner for one of the bypass dampers and to repair the leaks in the steam heating coils, to more evenly heat the air in the intake plenum.


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| FACILITY NAME (1) | DOCKET NUMBER (2) | LER NUMBER (6) | | | PAGE (3) |
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| Limerick Generating Station<br>Unit 1 | 0 5 0 0 0 3 5 2 | 8 7 | — 0 7 0 | — 0 0 | 0 2 OF 0 5 |

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

Unit Conditions Prior to the Event:

Operating Mode 1 (Power Operations)

Reactor Power - 100%

Description of the Event:

On December 31, 1987 at 0021 hours the Reactor Enclosure Secondary Containment isolated on low Reactor Enclosure to outside atmosphere differential pressure. Nuclear Steam Supply Shutdown System (NSSSS) Group VI A and B isolation signals (primary containment purge supply and exhaust) were received; however, the valves affected by these signals are normally closed and remained closed as designed. Both trains of the Standby Gas Treatment System (SGTS) and the Reactor Enclosure Recirculation System (RERS), Engineered Safety Features, initiated as designed. The low differential pressure condition resulted from the following sequence of events:

1. Temperature switch (TSL-076-105) received a low temperature indication from the temperature sensing element located along the wall of the Reactor Enclosure Ventilation intake plenum and tripped the Reactor Enclosure supply fans as designed.

2. Loss of supply air resulted in an excessive negative differential pressure situation causing the Reactor Enclosure exhaust fans to trip as designed.

3. Following the loss of the exhaust fans, Reactor Enclosure pressure increased and the Reactor Enclosure to outside atmosphere differential pressure decreased below the negative 0.1 inches water gauge setpoint for the designed 100 second time delay, resulting in the isolation of the Reactor Enclosure Secondary Containment on low differential pressure.

Following the SGTS initiations, the 'A' train of SGTS was placed in standby in accordance with procedure S76.9.A, "Verification of

Reactor Enclosure or Refueling Floor Secondary Containment Isolation". At 0027 hours the 'B' SGTS (OBV163) fan tripped and the 'A' SGTS fan automatically started as designed. The 'B' fan was restarted by placing the fan's handswitch in the run position; however, the 'A' fan automatically started again when the 'B' fan tripped after its handswitch was returned to the automatic position. The 'B' fan was then declared inoperable and the 'A' fan continued to operate as designed. The repeated tripping of the 'B' SGTS fan occurred because the associated flow switch's (FSL-076-341B) trip setpoint had drifted, allowing the fan to trip on a normal flow indication.

At 0132 hours the isolation was reset in accordance with General Procedure, GP-8" Primary and Secondary Containment Isolation Verification and Reset" and the Reactor Enclosure Ventilation was returned to normal operation. The Reactor Enclosure Secondary Containment had remained isolated for one hour eleven minutes.

Consequences of the Event:

There were no adverse consequences associated with this event. There was no release of radioactive material as a result of this event. The Reactor Enclosure Secondary Containment isolated as designed when the Reactor Enclosure to outside atmosphere differential pressure decreased below the negative 0.1 inches water gauge setpoint for the 100 second time delay. SGTS and RERS initiated as designed following the isolation. Although the 'B' SGTS fan tripped, the 'A' SGTS fan automatically initiated and functioned as designed.

Cause of the Event:

The event was caused by air leaking past the bypass dampers in addition to leaks in the steam heating coils. These conditions allowed stratification of cold air in the Reactor Enclosure supply intake plenum. The uneven distribution of cold air caused the temperature sensing element to initiate a low temperature signal to temperature switch TSL-76-105 when a one-foot section of the element was exposed to air below the 35 + 2 degrees F setpoint. Temperature switch (TSL-076-105) initiated a Reactor Enclosure supply fan trip signal as designed following the low temperature indication. Loss of the Reactor Enclosure supply

fans caused excessive negative pressure in the Reactor Enclosure causing the Reactor Enclosure exhaust fans to trip as designed. Reactor Enclosure Secondary Containment pressure increased causing the isolation on low differential pressure when the differential pressure decreased below negative 0.1 inches water gauge for the designated 100 second time delay.

Corrective Actions:

The isolation was reset at 0132 hours in accordance with General Procedure, GP-8 "Primary and Secondary Containment Isolation Verification and Reset" and the Reactor Enclosure Ventilation was returned to normal. Following the event, the 'B' SGTS fan's flow switch's trip setpoint was recalibrated and the 'B' fan was declared operable.

Actions Taken to Prevent Recurrence:

Following the event, a Temporary Circuit Alteration (TCA) was implemented to bypass the temperature switch's (TSL-076-105) Reactor Enclosure supply fan tripping logic, to prevent repeated supply fan trips on a low plenum temperature indication. The steam flow through the second set of heating coils which had been started on December 29, 1987 following a similar event, was then stopped. Temperature switch (TSL-076-105) had been installed to protect the Reactor Enclosure cooling coils from freezing in the event that heating steam is lost, by causing a Reactor Enclosure Secondary Containment isolation when supply air temperature in the plenum decreases to 35 $\pm$ 2 degrees F. The cooling coils are drained in accordance with procedure S76.4.B "Draining of Reactor Enclosure HVAC Supply Air Cooling Coils", therefore, bypassing the associated tripping logic will not adversely affect the operation of the Reactor Enclosure Ventilation. A permanent modification which will bypass the trip function of the temperature switch logic and replace it with an alarm function is being evaluated under Electric Production to Engineering (EPE) 1223.

During troubleshooting, bypass damper TD-C76-104-2 was found to be unresponsive to its positioner. A Maintenance Request Form (MRF) has been written to replace the positioner of the bypass damper. MRFs have also been issued for the repair of the leaks in the steam heating coils and will be implemented during the

next outage. In addition routine test RT-1-020-490-1 will be implemented to leak check the steam heating coils prior to the beginning of each heating season

EIIS Codes:

VB - Reactor Enclosure Ventilation

SA - Auxiliary Steam System

JM - NSSSS

AD - RERS

BH - SGTS

TS - Temperature Switch

FAN - Supply Fan

CDMP - Bypass Dampers, Positioners

HCL - Heating Coils

TE - Temperature Sensing Element

TA - Temperature Alarm

Previous Similar Occurrences:

Cause Code: (B15) Equipment Failure due to Normal Wear

Limerick LERs 87-065 and 87-067 reported an isolation of the Reactor Enclosure Secondary Containment on low differential pressure due to low intake plenum air temperature.

PHILADELPHIA ELECTRIC COMPANY

2301 MARKET STREET

P.O. BOX 8699

PHILADELPHIA, PA. 19101

(215) 841-4000

January 29, 1988

Docket No. 50-352

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

SUBJECT: Licensee Event Report
Limerick Generating Station - Unit 1

This LER concerns a Reactor Enclosure Secondary Containment Isolation on low Reactor Enclosure to outside atmosphere differential pressure due to the Reactor Enclosure supply fans tripping on low supply air temperature.

| | |
|---|---|
| Reference: | Docket No. 50-352 |
| Report Number: | 87-070 |
| Revision Number: | 00 |
| Event Date: | December 31, 1987 |
| Report Date: | January 29, 1988 |
| Facility: | Limerick Generating Station<br>P.O. Box A, Sanatoga, PA 19464 |

This LER is being submitted pursuant to the requirements of 10 CFR 50.73(a)(2)(iv).

Very truly yours,

R. H. Logue
Assistant to the Manager
Nuclear Support Division

cc: W. T. Russell, Administrator, Region I, USNRC
E. M. Kelly, Senior Resident Inspector

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