

**ILLINOIS
POWER**

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L45-92(01-13)-LP
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January 13, 1992

10CFR50.73

Docket No. 50-461

Document Control Desk
Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Clinton Power Station - Unit 1
Licensee Event Report No. 91-007-00

Dear Sir:

Please find enclosed Licensee Event Report No. 91-007-00:
Undetected Failure of An Air Handling Unit and Operations Lack of
Understanding of the Air Handling Unit Design and Operation Resulted in
Inoperable Leak Detection Instruments. This report is being submitted
in accordance with the requirements of 10CFR50.73.

Sincerely yours,

F. A. Spangenberg, III
F. A. Spangenberg, III
Manager, Licensing and Safety

KWD/alh

Enclosure

cc: NRC Clinton Licensing Project Manager
NRC Resident Office, V-690
NRC Region III, Regional Administrator
Illinois Department of Nuclear Safety
INPO Records Center

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LICENSEE EVENT REPORT (LER)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-630), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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

On December 12, 1991, with the plant in Power Operation, the 'B' Reactor Water Cleanup (RWCU) heat exchanger (Hx) room air handling unit (AHU) fan failed resulting in inoperable leak detection (LD) differential temperature (delta T) instrumentation. The Shift Supervisor noted the 'B' RWCU Hx room temperature increasing and the delta T recorder indicating zero, indicating a possible problem with the LD system. During the event, the LD instruments were initially declared inoperable and then incorrectly declared operable due to Operations lack of understanding of the AHU design and operation. Subsequent to this event, a review of the delta T recorder strip chart showed that the fan failed approximately two hours and twenty-five minutes before the Shift Supervisor had indication of the failure. Therefore, the requirements of Technical Specification 3.3.2 to isolate the HX within one hour were not met. No remote indication is available to identify the failure of the AHU within one hour. The causes of this event are an undetected failure of a fan resulting in inoperable LD instruments and Operations lack of understanding of the effect of the failed fan on the LD instruments. Corrective actions include evaluating the need for a Technical Specification change, reworking the failed fan, and training for Operations personnel on this event.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

EXPIRES: 8/31/88

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

DESCRIPTION OF EVENT

On December 12, 1991, with the plant at 100 percent power in Mode 1 (POWER OPERATION), at approximately 0925 hours, the Shift Supervisor noted an increasing trend in the 'B' (east) Reactor Water Cleanup system (RWCU) [CE] heat exchanger [HX] room temperature, as indicated by point sixteen on the equipment area ambient temperature recorder (1E31R608) [TR]. The Shift Supervisor noted the increasing temperature trend while pointing out specific drywell temperatures to an engineer. The Shift Supervisor immediately checked the differential temperature for the 'B' Hx room by checking point eleven on the equipment area differential temperature recorder (1E31R611) [TDR] which was indicating zero. This reading was indicative of a possible problem with the Leak Detection (LD) System [IJ]. Both the equipment area ambient and differential temperature instruments are part of the LD system. In response to this indication, the Shift Supervisor instructed the control room operators to dispatch a non-licensed operator to check the status of the air handling unit.

At 0933 hours, before the control room operators were able to dispatch a non-licensed operator to the area, the 'C' area non-licensed operator, conducting a routine containment tour, reported that the fan [FAN] shaft in the 'B' RWCU heat exchanger room air handling unit (1W005SM) [AHU] had apparently come out of its bearing housing.

At 0958 hours, after discussing the situation with the Supervisor - Licensing Operations, the Shift Supervisor determined it was necessary to declare the LD differential temperature instrumentation (1E31N618A) inoperable and isolate the 'B' RWCU heat exchanger within two hours as required by Technical Specification 3.3.2 action statement C.1. The Shift Supervisor made this decision based upon the incorrect understanding that the LD differential temperature instrumentation measured the differential temperature of the air through the air handling unit and that only one division of LD differential temperature instrumentation was affected.

At 1015 hours, after reviewing electrical and mechanical drawings, the Shift Supervisor correctly determined that the LD differential temperature instruments actually measured the differential temperature between the inlet and outlet Chilled Water (WO) [KM] flow through the air handling unit. The Shift Supervisor instructed the control room operators to dispatch a non-licensed operator to verify that the bypass valve [V] for the air handling unit temperature control valve [TCV] was open, thus verifying that chilled water was available to the air handling unit. The Shift Supervisor incorrectly believed that the LD differential temperature instruments were operable without air flow if full chilled water flow was available to the air handling unit.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMA NO. 3150-0104

EXPIRES: 6/31/88

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

At 1020 hours, the non-licensed operator verified the bypass valve for the air handling unit temperature control valve was in the full open position. Since the bypass valve was fully open, the Shift Supervisor declared the LD differential temperature instruments operable.

At 1040 hours, the Shift Supervisor informed the Supervisor - Licensing Operations that based upon having full chilled water flow he had declared the LD differential temperature instrumentation operable. The Supervisor - Licensing Operations and the Director - Plant Operations recommended that the 'B' RWCU heat exchanger be isolated because some unanswered questions remained about the operational requirements of the air handling unit in support of the LD differential temperature instrumentation.

By 1056 hours, operators had isolated the 'B' RWCU heat exchanger.

At 1130 hours, the Supervisor - Licensing Operations, after consulting with the architect engineer (Sargent and Lundy), notified the Shift Supervisor that both divisions of the LD differential temperature instruments were incapable of performing their intended function without air flow through the 'B' RWCU room air handling unit. The Shift Supervisor declared both divisions of the LD differential temperature instruments (1E31N618A/B) inoperable and verified that Technical Specification 3.3.2 action statement C.2, to isolate the 'B' RWCU heat exchanger, had been taken.

By 2000 hours, the 'B' RWCU heat exchanger room air handling unit had been repaired and the LD differential temperature instruments were declared operable.

Subsequent to the event, a review of the strip chart from the equipment area differential temperatures recorder determined that the 'B' RWCU heat exchanger room air handling unit fan had failed at approximately 0700 hours on December 12, 1991. Since the 'B' RWCU heat exchanger was not isolated until 1056 hours (approximately three hours and fifty six minutes after the fan had failed) this event constituted operation prohibited by Technical Specification 3.3.2 action statement C.2 which would have required the heat exchanger to be isolated within one hour.

No automatic or manually initiated safety system responses were necessary to place the plant in a safe and stable condition. In addition, no other equipment or components were inoperable at the start of this event such that the inoperable condition contributed to this event.

LICENSEE EVENT R (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

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TEXT (If more space is required, use additional NRC Form 306A's) (17)

CAUSE OF THE EVENT

The causes of this event were an undetected failure of a fan in the 'B' RWCU heat exchanger air handling unit which resulted in inoperable LD differential temperature instrumentation and Operations lack of understanding of the effect of the fan failure on the operability of the LD differential temperature instrumentation. The cause of the failure of the fan is still under investigation but is suspected to be a long term degradation of the fan shaft caused by an incorrectly sized belt (insufficient length). The IP Nuclear Station Engineering Department (NSED) is evaluating pulley sizing, belt sizing, fan performance and fan motor current in an effort to confirm this cause. This evaluation is expected to be completed by February 29, 1992. A supplemental report will be issued documenting the cause of the fan failure and any corrective actions taken to improve the reliability of the fan and preclude recurrence of this event. The supplemental report is expected to be completed by March 31, 1992.

At approximately 0700 hours, the fan shaft in the 'B' RWCU heat exchanger room air handling unit failed, which rendered both divisions of the LD differential temperature instruments inoperable. The broken fan was not discovered until 0933 hours and compensatory action was not taken until 1056 hours (when the 'B' RWCU heat exchanger was isolated). Therefore, the requirements of Technical Specification 3.3.2 action statement C.2 to isolate the RWCU heat exchanger were not met within one hour of both divisions of the LD differential temperature instruments becoming inoperable. Failure of the air handling unit may be identified, in the control room, by the differential temperature recorder indicating a decrease in temperature or by the equipment area ambient temperature recorder showing an increase in temperature. Both of the indications depend on the heat load in the room. However, the Technical Specification surveillance requirements only require a channel check to be performed for the LD differential temperature instruments at least once every twelve hours, whereas the Technical Specification action statement requires action to be taken within one hour. Therefore, no means exist to ensure that a failure of the air handling unit is identified within the one-hour time limit specified by the Technical Specification action statement.

The LD differential temperature instrumentation was incorrectly determined to be operable based on Operations lack of understanding of how the LD differential temperature instrumentation is affected by the operation of the air handling unit. Both air flow and chilled water flow through this type of air handling unit are needed to maintain both divisions of the LD differential temperature instruments operable. This lack of understanding has resulted in the failure to meet Technical Specification requirements for this event and in the past when performing preventive maintenance on the RWCU heat exchanger air handling units as well as when performing corrective maintenance on the RWCU pump room air handling units (which have a similar design).

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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

CORRECTIVE ACTION

The 'B' RWCU heat exchanger room air handling unit has been reworked in accordance with Maintenance Work Request D16874.

Illinois Power is evaluating the need for a Technical Specification change to increase the allowed out-of-service time of the LD differential temperature instrumentation based upon the availability of other LD instrumentation to perform isolations and alarms in the event of a system breach. This Technical Specification change would apply to the RWCU, Residual Heat Removal (RHR) [BO] Reactor Core Isolation Cooling (RCIC) [BW], and main steam tunnel LD differential temperature instrumentation. This evaluation is expected to be completed by February 28, 1992.

Operations shift crews have been informed of this event through issuance of an Operations Night Order. The review of this event by Operations shift personnel has resulted in a heightened awareness of the support system function of the air handling unit on the operability of the LD instrumentation. In addition, this Licensee Event Report will be routed to appropriate Operations personnel as required reading in order to enhance their understanding of how the air handling units support operability of the associated differential temperature instrumentation. This action is expected to be completed by February 28, 1992. Finally, this Licensee Event Report will be incorporated into Operations requalification training. Since requalification training will be suspended prior to and during the third refueling outage, requalification training on this event will be completed by November 21, 1992.

Nuclear Station Engineering Department has determined which air handling units have Technical Specification-related LD differential temperature instrumentation. The preventive maintenance tasks which require removal of the air handling unit from service will be revised to identify that removing the air handling unit from service renders LD instruments inoperable and action is required in accordance with Technical Specification 3.3.2. These preventive maintenance revisions are expected to be completed by January 31, 1992.

ANALYSIS OF EVENT

This event is reportable under the provisions of 10CFR50.73(a)(2)(i)(B) because the plant was operated in a condition prohibited by Technical Specifications.

The LD differential temperature instrumentation was inoperable approximately two hours and twenty-five minutes prior to discovery.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

EXPIRES: 6/31/88

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TEXT (If more space is required, use additional NRC Form 305A's) (17)

A review of the maintenance history for the air handling units with LD differential temperature instrumentation determined that the air handling units for the RWCU heat exchanger rooms were routinely shut down for preventive maintenance every six months and that the RWCU pump room air handling units were shut down on January 18, 1990 for corrective maintenance.

Analysis of the safety consequences and implications of this event indicates that this event was not nuclear safety significant. Taking the air handling units out of service does not affect the operability of the ambient room temperature LD instruments or the differential flow instruments. During this event, the 'B' RWCU heat exchanger ambient room temperature LD instruments and the differential flow instruments were operable and able to perform isolations and alarms in the event of a system breach. During this event no system breach occurred.

ADDITIONAL INFORMATION

The RWCU air handling unit 1W035SM is model number CLCH No. 1CMPV manufactured by TRANE Company.

For further information regarding this event, contact P. D. Yocum, Director - Plant Operations at 217-935-8881, Extension 3205.