



**Commonwealth Edison**

Quad Cities Nuclear Power Station  
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RLB-92-089

April 8, 1992

U. S. Nuclear Regulatory Commission  
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Washington, DC 20555

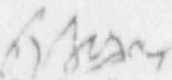
Reference: Quad Cities Nuclear Power Station  
Docket Number 50-254, DPR-29, Unit One

Enclosed is Licensee Event Report (LER) 92-008, Revision 00, for Quad Cities Nuclear Power Station.

This report is submitted in accordance with the requirements of the Code of Federal Regulations, Title 10, Part 50.73(a)(2)(v)(D). The licensee shall report any event or condition that alone could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident.

Respectfully,

COMMONWEALTH EDISON COMPANY  
QUAD CITIES NUCLEAR POWER STATION

  
R. L. Bax  
Station Manager

RLB/TB/plm

Enclosure

cc: J. Schrage  
T. Taylor  
INPO Records Center  
NRC Region III

STMGR 207

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PDR ADDCK 05000254  
S PDR

*Handwritten initials/signature*

## LICENSEE EVENT REPORT (LER)

Form Rev 2.0

Facility Name (1) Quad Cities Unit One  
 Title (4) Unit One RHR Room Coolers Fouled With Debris Due to Insufficient Cleaning

Docket Number (2) 015000254  
 Page (3) 1 of 6

Unit One RHR Room Coolers Fouled With Debris Due to Insufficient Cleaning

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)
01	05	91	91	008	010	04	09	91		015000011

OPERATING MODE (9) 1

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (Check one or more of the following) (11)

20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
20.405(a)(i)(i)	50.36(c)(1)	X 50.73(a)(2)(v)	73.71(c)
20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	Other (Specify
20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	in Abstract
20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	below and in
20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	Text)

## LICENSEE CONTACT FOR THIS LER (12)

Name: Michael Ford, Ext. 2118

TELEPHONE NUMBER: AREA CODE 3169, 6154, -2241

## 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) X NO

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

## ABSTRACT:

At 1345 hours on January 5, 1991, Unit One was in the Shutdown Mode in the cold condition. Inspections of the 1A and 1B Residual Heat Removal (RHR) [BO] Room Coolers [CLR] found that they were fouled with silt and small debris. At that time the condition of the room coolers were not considered to be a degradation of RHR system.

A re-evaluation of these inspections on March 11, 1992 determined that the ability of the Unit One RHR system to provide long term cooling following an accident had been put into question.

The 1A and 1B RHR room coolers were fouled due to insufficient cleaning, which allowed accumulation of sediment and debris to block respectively 39 and 13.6 percent of the tubes.

The corrective action for this event was to clean the room coolers when fouling was originally discovered. The stations implementation of Generic Letter 89-13 will insure that the coolers remain clean through periodic inspections and the installation of monitoring equipment.



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Quad Cities Unit One	015101010121514	912	-	01018	-	010	013	Of	016				
TEXT Energy Industry Identification System (EIIIS) codes are identified in the text as (XX)													

The fouled condition of the 1A room cooler required that the 1B room cooler be inspected for similar plugging. GL 89-13 requires that the sister components be inspected if components are found to be fouled during the initial inspection.

On January 5, 1991, at 1345 hours, the 1B RHR room cooler was inspected. This inspection found that 26 tubes out of a total of 192 were blocked in the room cooler. This represents 13.6 percent of the tubes being completely blocked. General silt accumulation was estimated to result in an additional ten percent loss in heat transfer capability.

The working department was directed to clean the cooler following the inspection. At 1100 hours on January 8, 1991 a post cleaning inspection was performed. The inspection insured that the cooler coils were clean and free of all blockage prior to reassembly.

At this time the fouling of the RHR room coolers was not considered to be a degradation of the RHR system. A study by the Nuclear Fuel Services (NFS) Department indicated that the RHR room cooler may not even be needed for the RHR system to perform its design function. This study was in the review process and had not been implemented at the station.

The implementation of GL 89-13 committed the station to inspect one loop of coolers each outage and only expand to sister components on the same unit when fouling was evident. Inspection of Unit Two components was planned for the next refuel outage (Q2R11). As the fouling of the Unit One RHR room coolers was not considered to degrade the RHR system, it was felt that immediate inspection of the Unit Two coolers was not warranted.

On March 4, 1992, Unit two was in the Refuel Mode for a scheduled Refuel outage (Q2R11). Inspections of the 2A and 2B RHR room coolers found that they were fouled beyond these design limits. At this time the results of these inspections were viewed as a degradation of the RHR system and a 4-hour non-emergency notification was made to the Nuclear Regulatory Commission (NRC). The Unit Two cooler fouling is further detailed in Licensee Event Report 92-007.

On March 11, a review of the previous Unit One room cooler inspections was performed due to the reportability of the Unit Two RHR coolers. This review resulted in the determination that a report should have been made for the degradation of the Unit One RHR system. The room coolers may not have been able to remove the required heat from the rooms during a design base accident (DBA). This would have degraded the ability of the RHR system to provide long term heat removal.

At 1100 hours a 4-hour non-emergency notification was made to report the degradation of the RHR system, found during the previous Unit One Refuel outage.

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Quad Cities Unit One	0   5   0   0   0   2   5   4	9   2	-   0   0   8	-	0   0	0   4	0   0	0   6				
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C. APPARENT CAUSE OF EVENT:

This report is being submitted in accordance with the requirements of 10CFR50.73(a)(2)(v)(B) which requires the reporting of any event or condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident.

The 1A and 1B RHR room coolers were fouled due to insufficient cleaning, which allowed accumulation of sediment and debris to block respectively 39 and 13.6 percent of the tubes.

The 1A and 1B RHR room coolers had not been cleaned in over ten years. Regular inspection and cleanings were not required or performed for the Emergency Core Cooling System (ECCS) room coolers.

Generic Letter (GL) 89-13 was issued to inform the nuclear industry of the need to insure that service water systems are able to provide required cooling in the event of a design base event. In response to this letter, Quad Cities Station committed to testing or inspecting various components of the service water systems. This commitment required the station to test or inspect the components of one loop per refueling outage. It was during the inspection of the Unit One "A" loop components that the 1A RHR room cooler was found to be partially plugged. This determination required the station to expand its inspection to cover the 1B RHR room cooler. The inspection of the 1B room cooler determined similar fouling.

The room cooler cooling water is supplied by the Unit Diesel Generator Cooling Water (DGCW) Pump. The DGCW pumps take a suction from the Residual Heat Removal Service Water (RHRSW) pump suction header. This system uses Mississippi river water as the heat sink. The river water that is pumped through the system contains silt and small debris.

These coolers had not been opened for cleaning or inspections for over ten years. Over this period of time blockage occurred due to the accumulation of silt and debris in regions of low flow, or during periods while the pumps are off.

D. SAFETY ANALYSIS OF EVENT:

The safety consequences of this event was minimal. The degradation of the room coolers would not have prevented RHR system pumps and valves from performing their immediate design safety function. There was no damage to the RHR system, plant operating parameters, or to station personnel.



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\*TEXT Energy Industry Identification System (EIIS) codes are identified in the text as [XX]

The design heat removal for the room coolers is based on a cooling water temperature of 95 degrees. The maximum historical Mississippi river temperature recorded at the station was 88.7 degrees. A computer model of the coolers, using a unit two RHR room cooler that had 58 percent blockage, determined that at a maximum river temperature of 87 degrees the cooler would have been able to provide adequate heat removal. The majority of the historical river water temperature data is significantly less than 87 degrees. This study would indicate that the 1A and 1B RHR room coolers would have been capable of removing the design heat load at all times, as they were less fouled.

The partial plugging of a room cooler would still allow some heat removal from the room. A gradual temperature increase could occur if the fouling and a high river temperature prevented adequate heat removal. The Environmental Qualification temperature for the RHR corner rooms is 150 degrees. This would mean that the RHR system would have been available for a period of time before the room temperature reached the upper limit.

A study performed by Nuclear Fuel Services (NFS) determined that the ECCS room coolers are not required for rooms that are open to the reactor building. This would exempt the Unit One RHR room cooler from being required to be operable as heat would exit the room through the open hatches. The study indicates that the fouled coolers would not degrade the RHR system. Although this study has not yet been implemented by the station, it further demonstrates the probability that adequate cooling was available at all times.

#### E. CORRECTIVE ACTIONS:

The immediate corrective action after the inspections was to direct the working group to clean the room coolers. This insured that the RHR room coolers would be capable of removing the heat loads from the RHR corner rooms, and maintain the rooms below their EQ temperature limit.

After the room coolers were cleaned, a post cleaning inspection was performed. These inspections determined that all tubes were clean and free of debris. As these rooms coolers have not been cleaned in over ten years, and the plugging was only partial, it is believed that the fouling was a gradual process. Per the station commitment to GL 89-13, one loop of room coolers will be inspected each outage. Due to similar design, the station has expanded its commitment to GL 89-13, to inspect both "A" and "B" loops of the RHR and Core Spray room coolers each outage. This will prevent the reoccurrence of significant fouling due to long periods without cleaning.

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TEXT Energy Industry Identification System (EIIS) codes are identified in the text as [XX]															

Per the station commitment to generic letter 89-13, a method of monitoring the condition of these room coolers is being implemented. Modification M4-1(2)-87-026, ECCS Room Cooler Mod, has installed pressure gauges on the inlet and outlet of the coolers. A procedure to trend and analyze these pressures has been developed. This will insure that if a cooler is becoming blocked, action can be taken before the design margin is exceeded.

F. PREVIOUS EVENTS:

This report is being made after-the-fact, due to the results of similar inspections performed during the Unit Two Refuel outage (Q2R11). These inspections found similar fouling of the Unit Two RHR room coolers, and is documented in Licensee Event Report 92-007.

G. COMPONENT FAILURE DATA:

There was no component failure associated with this event.