

LICENSEE EVENT REPORT (LER)

Form Rev 2.0

Facility Name (1) Quad Cities Unit One
 Docket Number (2) 0 | 5 | 0 | 0 | 0 | 2 | 5 | 4
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 Title (4) Unit One A Core Spray Room Cooler Inoperable Due to a Broken Fan Belt Caused by Insufficient Preventive Maintenance

Unit One A Core Spray Room Cooler Inoperable Due to a Broken Fan Belt Caused by Insufficient Preventive Maintenance

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)
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OPERATING MODE (9) 4

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

<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(c)(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"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> Other (Specify in Abstract below and in Text)
<input type="checkbox"/> 20.405(a)(1)(iii)	<input type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)	
<input type="checkbox"/> 20.405(a)(1)(iv)	<input type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(viii)(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: K. J. Hill, Technical Staff Engineer, Ext. 2150
 TELEPHONE NUMBER: AREA CODE 3 | 0 | 9, 6 | 5 | 4 | - | 2 | 2 | 4 | 1

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
E	B M	C L R	B S I S	Y					

SUPPLEMENTAL REPORT EXPECTED (14)

Expected Submission Date (15) _____

[Yes (If yes, complete EXPECTED SUBMISSION DATE)] YES NO

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

ABSTRACT

On August 22, 1988, Quad Cities Unit One was in the RUN mode at 60 percent thermal power. At 0330 hours, during routine plant rounds, it was discovered that the Unit One A Core Spray room cooler was not operable. An inspection of the room cooler discovered that of the two fan belts installed, one belt was broken and the other belt was off the pulley. This rendered the 1A Core Spray and the Unit One Reactor Core Isolation Cooling (RCIC) systems inoperable. Because the RCIC system was inoperable, NRC notification was necessary and this was completed at 0425 hours per 10CFR50.72. Required surveillances were completed, and the fan belts were replaced on the same day.

The cause of this event was insufficient preventive maintenance program. The room coolers are verified operable daily by the operating department and inspected by maintenance during refuel outages. At the last refuel inspection, these belts were declared serviceable and not replaced.

Corrective actions include replacement of the other room cooler fan belts and procedure revision to require replacement of the belts during refuel outages. This report is provided to comply with 10CFR50.73(a)(2)(v).

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

PLANT AND SYSTEM IDENTIFICATION:

General Electric - Boiling Water Reactor - 2511 Mwt rated core thermal power.

EVENT IDENTIFICATION: Unit One A Core Spray Room Cooler inoperable due to a broken fan belt caused by insufficient preventive maintenance.

A. CONDITIONS PRIOR TO EVENT:

Unit: One Event Date: August 23, 1988 Event Time: 0341 hours
 Reactor Mode: 4 Mode Name: RUN Power Level: 60%

This report was initiated by Deviation Report D-4-1-88-057.

RUN Mode (4) - In this position the reactor system pressure is at or above 825 psig, and the reactor protection system is energized, with APRM protection and RBM interlocks in service (excluding the 15% high flux scram).

B. DESCRIPTION OF EVENT

At 0330 hours on August 22, 1988, Unit One was operating in the RUN mode at approximately 60 percent reactor (RCT) thermal power. The Unit Two Equipment Attendant (EA) was performing normal operating rounds per procedure QOS 005-S14 (Unit Two Equipment Attendants Operator's Surveillance/Turnover). As part of the rounds, the EA inspects all Emergency Core Cooling System (ECCS) room coolers [CLR] located in the Unit One and Unit Two Reactor Building [NG] basement. This covers Residual Heat Removal (RHR) [BO], Core Spray [BM], and High Pressure Coolant Injection (HPCI) [BJ] room coolers.

During the surveillance, the EA found the Unit One A Core Spray room cooler to be off and was not able to start it manually. The EA notified control room personnel that the 1A Core Spray room cooler was inoperable. The room cooler is located in the room containing the 1A Core Spray pump [P] and Unit One Reactor Core Isolation Cooling (RCIC) [BN] turbine [TRB]. At 0330 hours on August 22, 1988, the 1A Core Spray system and Unit One RCIC system were declared inoperable. QOS 1400-01 (Core Spray System Outage Report) and QOS 1300-01 (RCIC System Outage Report) were initiated.

Control room personnel requested that the EA check the fan belts on the room cooler and dispatched an operator to check the fan motor circuit breaker.

The breaker for the room cooler was checked by operating personnel and found to be working correctly. However, closer inspection of the room cooler found one fan belt, of the two belts installed, to be broken and the other belt off of the pulley. The EA placed the loose belt back on the pulley and started the room cooler. The room cooler operated satisfactorily and was left in operation. Work Request Q68920 was written to replace the fan belts.

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Because the Unit One RCIC system was declared inoperable, the NRC was notified via the Emergency Notification System (ENS). This was completed at 0425 hours on August 22, 1988, to comply with the requirements of 10CFR50.72.

At 1725 hours on August 22, 1988, the 1A Core Spray room cooler was taken out-of-service after all required system outage surveillances were successfully completed. Mechanical Maintenance personnel replaced the room cooler fan belts and realigned the belt pulley. Inspection of the V-belt found considerable wear and signs of cracking. The belt pulleys were approximately 1/4 inch out of alignment. At 2210 hours on August 22, 1988, the 1A Core Spray room cooler was returned to service. The 1A Core Spray system and RCIC system were declared operable and the required outage surveillances terminated.

C. APPARENT CAUSE OF EVENT:

This event is being reported because the Unit One RCIC system was declared inoperable and 10CFR50.73(a)(2)(v) requires the licensee to report any event or condition that alone could have prevented the fulfillment of the safety function of structures or systems that are needed to remove residual heat.

The cause of this event is insufficient preventive maintenance program. The failure of the room cooler belt is due to normal end of life. Inspection of the belts that were removed showed signs of normal wear (i.e., brittleness and cracking) but showed little evidence of wear due to misalignment (i.e., frayed or scored edges). The room cooler belts which failed were installed in August, 1986. The room coolers and belts are checked once per day by operating personnel.

The room cooler had been inspected by maintenance personnel during the Fall 1987 Unit One refuel outage as part of procedure QMPM 5700-1 (Emergency Air Handling Unit Maintenance and Inspection). However, the belts were visually inspected, determined to be acceptable, and not replaced. If the belts had been replaced during the outage inspection, it would have prevented failure of the belts during operation.

D. SAFETY ANALYSIS OF EVENT:

The safety of the plant and operating personnel was not affected during this event. The Unit One HPCI and the Low Pressure Coolant Injection (LPCI) mode of RHR were successfully tested after finding the 1A Core spray room cooler inoperable and prior to removing it from service for repairs. Therefore, all other ECC systems including the B loop of Core Spray were operable throughout the event.

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Although the 1A Core Spray system and RCIC system were not operable per Technical Specifications' definition, the two systems were available throughout the event. The Core Spray pump and RCIC turbine would have still initiated and operated as normal. Technical Specifications section 1.0.M defines operable as "capable of performing its specified function(s). Implicit in this definition shall be the assumption that all necessary attendant instrumentation, controls, normal and emergency electrical power sources, cooling or seal water, lubrication or other auxiliary equipment that are required for the system, subsystem, train, component or device to perform its function(s) are also capable of performing their related support function(s)."

The ECCS room coolers are necessary to maintain room temperatures to meet equipment qualification requirements. However, an analysis by Commonwealth Edison's Nuclear Fuel Services (NFS) Department has shown that the maximum temperature that would exist in the 1A Core Spray pump room under a Loss of Coolant Accident (LOCA) together with a loss of the room cooler would not exceed the equipment qualification test temperature. This analysis is based on a pre-accident room temperature of 104 degrees Fahrenheit. This report is documented in a letter from Henry E. Bliss to J. S. Abel, dated March 16, 1987, entitled, "Final Report - Quad Cities ECCS Pump Room Response to Loss of Room Coolers."

The failure of the fan belt was found during performance of a daily surveillance, so that the maximum amount of time the fan failure could have gone undetected is 24 hours. The loose belt was re-installed and the room cooler started within 20 minutes of discovery. The fan was out-of-service for repairs for less than five hours. This short period of unavailability did not allow the temperature of the room to change appreciably. Therefore, the failure of the room cooler did not affect the availability of the 1A Core Spray and the Unit One RCIC system.

F. CORRECTIVE ACTIONS:

The immediate corrective action consisted of re-installing the loose fan belt and operating the room cooler temporarily on one fan belt. Once the required outage surveillances were completed, the room cooler was taken out-of-service and the fan belts replaced.

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Work Requests have been initiated for the balance of the room coolers to replace the fan belts during the next available system outages.

Q69318	U1 B Core Spray
Q69321	U1 A RHR
Q69322	U1 B RHR
Q69319	U1 HPCI
Q69316	U2 A Core Spray
Q69317	U2 B Core Spray
Q69323	U2 A RHR
Q69324	U2 B RHR
Q69320	U2 HPCI

This effort will be tracked with Nuclear Tracking System numbers 2542008805701 (Unit One) and 2542008805702 (Unit Two).

To prevent recurrence of this event, the refuel outage maintenance surveillance, QMPM 5700-1, will be revised to require replacement of all ECCS room cooler fan belts each refuel outage (NTS 2542008805703). This frequency should be sufficient based on the fact that the fan belt in this event failed after two years of operation.

A revision to Technical Specifications is currently being prepared to allow a Limiting Condition for Operation (LCO) of ECC systems when a room cooler is found inoperable. This revision would allow the ECC system to remain operable for a maximum period of time (most likely 24 hours) while repairs are made to the room cooler (NTS 2542008805704).

During the course of the investigation for this event, it was determined that metal covers installed around the belts of the room coolers make it difficult for operating personnel to inspect the belts. The station will investigate replacing the current covers with a wire screen type cover to allow easy visual inspection of the fan belts (NTS 2542008805705).

F. PREVIOUS EVENTS:

There are seven previous reports of ECC system inoperability due to broken fan belts on room coolers. The last previous event occurred on June 26, 1986, and is documented in Licensee Event Report 265/86-009. The previous events involved repetitive failures that were attributed to a split-sheave pulley installed on the room coolers. Over time, the split-sheave pulley separated slightly. This resulted in extreme wear of the belt and frequent failures. All split-sheave pulleys on ECCS room coolers were replaced in late 1986/early 1987. This is the first report of belt failure since the previous pulleys were replaced.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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A search of Nuclear Product Reliability Data System (NPRDS) found nine previous similar occurrences. These events all involved belts which failed as a result of normal wear and end of life.

G. COMPONENT FAILURE DATA:

The room cooler was manufactured by Buffalo Forge Company, Type G-152 HV. The fan belts were manufactured by the Gates Company, Part Number B-68.



Commonwealth Edison

Quad Cities Nuclear Power Station
22710 208 Avenue North
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Telephone 309/654-2241

RLB-88-308

September 9, 1988

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

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

Enclosed is Licensee Event Report (LER) 88-013, 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): 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 remove
residual heat.

Respectfully,

COMMONWEALTH EDISON COMPANY
QUAD-CITIES NUCLEAR POWER STATION

R. A. Rabe
R. L. Bax
Station Manager

RLB/DWH/ad

Enclosure

cc: I. Johnson
R. Higgins
INPO Records Center
NRC Region III

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