

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	Page (3) 1 of 0 4
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Title (4)
B Control Room HVAC System was Declared Inoperable due to Crankcase Heater Power Supply Design Deficiency.

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	0	1	1	9	6	9	6	--	0	2	1	--	0	0	1	1	0	6	9	6			0	5	0	0	0	2	6	5

OPERATING MODE (9) 1		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (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(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 Charles Peterson, Regulatory Affairs Manager, ext. 3602						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

SUPPLEMENTAL REPORT EXPECTED (14)						Expected Submission Date (15)	Month	Day	Year
<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE)						<input checked="" type="checkbox"/> NO			

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

ABSTRACT:

On October 3, 1996, Problem Identification Form (PIF) # 96-2888 was initiated to document a concern that the crankcase heater for the Refrigeration Condensing Unit (RCU) for the 'B' Control Room (CR) Heating, Ventilation and Air Conditioning (HVAC) System was being powered from a non-safety related bus. The 'B' CR HVAC System is a safety-related system. The crankcase heater keeps the freon out of the crankcase and out of the oil. On October 11, 1996 at 1720 hours the 'B' Control Room HVAC System was declared inoperable. The station entered a 30 day Limiting Condition for Operation (LCO) per Technical Specification 3.8.D.1.b, because the crankcase heater was fed from a non-safety related bus.

The root cause of the event was a system/component function design deficiency in the crankcase heater power supply. This error was made in the original Modification M04-0-82-002. Follow-up actions completed include rewiring the crankcase heater to safety related motor control center (MCC) 18-4. The 'B' Control Room HVAC System was declared operable on October 27, 1996 at 2028 hours. QCOS 5750-02, "Control Room Emergency Filtration System Monthly Test," was revised to allow for measurement of the oil temperature on the 'B' CR HVAC Compressor.

The purpose of the 'B' CR HVAC system is to protect Control Room Personnel from toxic gas and radioactive particles. This event would not impact the health and safety of the public. Without the Refrigeration Condensing Unit in operation the CR could not be maintained at the desired temperature range of approximately 70-80 degrees F.

LER265/96/021.WPF

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		Year		Sequential Number		Revision Number					
Quad Cities Unit One	0 5 0 0 0 2 5 4	9 6	-	0 2 1	-	0 0	2 OF 0 4				
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: B Control Room HVAC System was Declared Inoperable due to Crankcase Heater Power Supply Design Deficiency.

A. CONDITIONS PRIOR TO EVENT:

Unit: One	Event Date: October 11, 1996	Event Time: 1720
Reactor Mode: 1	Mode Name: POWER OPERATIONS	Power Level: 100%
 Unit: Two	 Event Date: October 11, 1996	 Event Time: 1720
Reactor Mode: 1	Mode Name: POWER OPERATIONS	Power Level: 100%

This report was initiated by Licensee Event Report LER254\96-021.

Power Operation (1) - Mode switch in the RUN position with average reactor coolant temperature at any temperature.

B. DESCRIPTION OF EVENT:

The 'B' Train of the Control Room (CR) Heating, Ventilation and Air Conditioning (HVAC) System [VI] is Safety Related, but the crankcase heater for the Refrigeration Condensing Unit (RCU) was powered from a Non-Safety Related motor control center (MCC). This difference in the power supplies was part of the original design installed in 1982, under modification M04-0-82-002.

In March 1996, the B Control Room HVAC System was declared inoperable due to planned work on MCC 16-3 [ED]. This MCC provides power to the crankcase heater for the RCU for the 'B' CR HVAC System. By elevating the temperature, the crankcase heater prevents the freon from entering the crankcase and mixing with the refrigerant oil. The mixing of refrigerant and oil reduces lubrication.

In August 1996, a root cause investigation generated Engineering Request (ER) #9604831 to determine the need for the crankcase heater. Subsequently, it was determined that the crankcase heater was needed for proper operation of the RCU. This response prompted System Engineering to question why the crankcase heater was powered from a non-safety related power bus and all other components were powered from safety related buses.

On October 3, 1996, System Engineering initiated Problem Identification Form (PIF) #96-2888 to analyze if the crankcase heater is required for the Refrigeration Condensing Unit to be considered operable. The issue screening determined that the crankcase heater is required to maintain an oil temperature of at least 99 degrees F in the crankcase when the compressor is not running. Without the crankcase heater, the compressor will not be able to ensure that the CR is maintained within 70 to 80 degree F range, as detailed in section 9.4.1.1 of the Updated Final Safety Analysis Report (UFSAR).

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

On October 11, 1996 at 1720 hours, the RCU of the 'B' Control Room HVAC System was declared inoperable and the Station entered a 30 day Limiting Conditioning for Operation per Technical Specification 3.8.D.1.b. ER #9605509 was written to install a safety related crankcase heater and a safety related power supply to the crankcase heater. This work was done under Work Request #960097346. The Design Change was completed on October 27, 1996 and the 'B' Control Room HVAC System was tested and declared operable on October 27, 1996 at 2028 hours.

C. CAUSE OF EVENT:

Research into the original installation documentation of the 'B' Control Room HVAC System did not reveal a justification for the non-safety related power supply for the crankcase heater.

The root cause of this event was System/Component functional design deficiency. This deficiency was part of the original Modification M04-0-82-002. Review of the modification documentation revealed a number of memos that interchanged between the designer and the station discussing the required safety classification of this system. None of these memos specifically addressed the crankcase heater. It is unknown why the wrong assumptions were made during original design of the 'B' CR HVAC System.

D. SAFETY ANALYSIS:

The safety consequences of this event are minimal. Carrier Corporation, the manufacturer of the compressor, has informed the station that with a proper pump down, the compressor can function without a crankcase heater for approximately 12 hours. Crankcase heater failure during cycle off times can cause a compressor failure. No pump down occurs during cycle off times. There is no alarm on the crankcase heater which is another possible failure mode. During a Loss of Off-Site Power (LOOP) accident the compressor would automatically start on loss of the 'A' Control Room HVAC System. During a Loss of Coolant Accident (LOCA), the compressor would have a crankcase heater in operation at all times. During a LOCA/LOOP the compressor would sit idle for less than an hour initially until the 'B' Control Room HVAC is started manually per operating procedure.

Loss of the RCU would not cause the Air Filtration Unit or the Air Handling Unit to become inoperable. Therefore, CR Personnel would still be protected from radioactive effluents and toxic gas. Without the RCU the CR could not be maintained at the desired temperature range of approximately 70-80 degrees F.

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Quad Cities Unit One				0 5 0 0 0 2 5 4				9 6 -		0 2 1 -		0 0			
TEXT Energy Industry Identification System (EIIIS) codes are identified in the text as [XX]														4 OF 0 4	

E. CORRECTIVE ACTIONS:

Corrective Actions Completed:

1. PIF #96-2888 was written to document/investigate the need for a safety-related power supply for the crankcase heater for the 'B' CR HVAC System. The 'B' CR HVAC system was declared Inoperable on October 11, 1996 at 1720 hours.
2. Design Change Notice #9600380 was issued, which replaced the crankcase heater with safety related heater and rewired the power supply to MCC 18-4 which is safety related.
3. QCOS 5750-02, "Control Room Emergency Filtration System Monthly Test," was revised to allow measuring the oil temperature in the crankcase once a month during the 'B' Control Room HVAC surveillance.
4. QCOS 0005-S13, "U-1 Equipment Attendants' surveillance/turnover sheets," were submitted for revision to allow checking the crankcase heater operation.

Corrective Actions to be Completed:

1. None.

F. PREVIOUS OCCURRENCES:

The following similar LERs have occurred since 1995 regarding design problems.

- 254/95-007 "The Control Rod Drive Scram discharge Volume's Control Logic Fails to meet the single Failure Criteria Due to Design Deficiency."
- 254/96-002 "Offsite power of TGA relay would deenergize preventing CR Emergency Filtration Unit Booster fans from starting due to inadequate design."
- 254/96-005 'B'"Control Room HVAC System inoperable due to outside temperature falling below design limit."

G. COMPONENT FAILURE DATA:

None.