

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 6												
Title (4) "B" Train Control Room HVAC Failed to Maintain the Upgraded Technical Specifications' requirement for Control Room Pressurization due to Misapplication or Interpretation of Design Inputs and Regulatory Requirements.																											
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	2	8	9	6	9	6	--	0	2	2	--	0	0	1	1	2	5	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			20.402(b)				20.405(c)				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)												
			20.405(a)(1)(iii)				X 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 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															
YES (If yes, complete EXPECTED SUBMISSION DATE)										X NO																	
ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)																											

ABSTRACT:

On October 28, 1996 at 0110 hours the Control Room Emergency Ventilation System (CREVS), which affects both units, was declared inoperable because the control room (CR) could not be demonstrated to be at the required positive pressure. The cause of the event was misapplication or interpretation of design inputs and regulatory requirements. The monthly CREVS test recorded differential pressure from the CR to the hall, not from the CR to all adjacent areas as required by the technical specifications. Follow-up actions included revising QCOS 5750-02, "Control Room Emergency Filtration System Monthly Test," sealing penetrations and ducts, and measuring airflows. The CREVS was declared operable at 2000 hours on November 03, 1996.

The impact of this event was minimal, as it is very unlikely during a loss of coolant accident (LOCA) that CR personnel would have received radiation exposure in excess of the 5 rem whole body or 30 rem to the thyroid limit of General Design Criterion 19.

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PLANT AND SYSTEM IDENTIFICATION:

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

EVENT IDENTIFICATION: "B" Train Control Room HVAC Failed to Maintain the Upgraded Technical Specifications' requirement for Control Room Pressurization due to Misapplication or Interpretation of Design Inputs and Regulatory Requirements.

A. CONDITIONS PRIOR TO EVENT:

Unit: One	Event Date: October 28, 1996	Event Time: 0110
Reactor Mode: 1	Mode Name: Power Operation	Power Level: 100%

Unit: Two	Event Date: October 28, 1996	Event Time: 0110
Reactor Mode: 1	Mode Name: Power Operation	Power Level: 24%

This report was initiated by Licensee Event Report LER 254/96-022

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

B. DESCRIPTION OF EVENTS:

Problem Identification Form (PIF) # 96-2892 was initiated to ensure that the Control Room Emergency Ventilation System (CREVS) [VI] is able to pressurize the control room (CR) [NA] to a positive pressure of 1/8" (.125") water gauge (w.g.) relative to adjacent areas as required by the recently approved upgraded Technical Specifications (TSs) (Section 4.8.D.5.c). The initial conclusion was that Quad Cities Nuclear Station (QCNS) was verifying the 1/8" w.g. positive pressure in the CR, as documented by monthly surveillance QCOS 5750-02, "Control Room Emergency Filtration System Monthly Test," which recorded the differential pressure of the CR versus the Service Building hallway utilized for ingress and egress of the CR. Subsequent evaluation determined that QCNS must measure the CR pressure versus each of the adjacent areas to satisfy the TS 4.8.D.5.c requirement.

Measurement of the differential pressure of the CR versus all the adjacent areas showed the CR to be at least a positive 1/8" w.g. in relation to the roof and all adjacent areas on the same elevation as the CR. However, the CR could not be demonstrated to be 1/8" w.g. greater than the cable spreading room [NA], which is located directly below the CR. As a result, the CREVS was declared inoperable at 0110 hours, October 28, 1996, and QCNS (both units) entered a 7 day Limiting Conditions for Operation (LCO) as required by TS 3.8.D.1.

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A review of the Updated Final Safety Analysis Report (UFSAR) (sections 6.4, 6.5, 9.4.1, 15.6.5.5) revealed inconsistencies when detailing the areas to be maintained at 1/8" w.g. positive pressure by the "B" CR heating, ventilation and air conditioning (HVAC) system. The 1/8" pressurization is applied interchangeably to the CR and the CR emergency zone, which consists of the CR, the cable spreading room, the aux electrical equipment room and train "B" CR HVAC equipment room. The 1/8" w.g. positive pressure application to the CR emergency zone is the nominal pressure to be maintained in order to credit zero infiltration through the emergency zone boundary for the CR Dose Analysis (UFSAR Section 15.6.5.5.3).

Actions taken during the LCO included identifying and sealing CREVS ductwork leaks, sealing penetrations from the CR emergency zone to adjacent areas, measuring airflows to verify design airflow, and revising monthly surveillance QCOS 5750-02 to include differential pressure testing of the CR in relation to all adjacent areas. QCOS 5750-02 (revised procedure) was performed on November 3, 1996, which demonstrated that the CR was maintained at 1/8" w.g. positive pressure in relation to all adjacent areas.

Although the TS requirement could be met with respect to the CR pressurization, it was recognized that the remaining areas within the CR emergency zone were not being maintained at a 1/8" w.g. positive pressure. As a result, testing was performed to determine the unfiltered infiltration rate into the CR emergency zone. In addition, a CR dose analysis sensitivity calculation was performed to assess the dose impact on CR personnel of higher infiltration rates. This calculation utilized the International Commission of Radiation Protection (ICRP) Publication 30 dose conversion factors and fission product scrubbing (Standard Review Plan (SRP) 6.5.5) which had not been utilized in the current CR dose analysis (UFSAR 15.6.5.5.3). Testing revealed an unfiltered inleakage of 275 ± 99 scfm, which exceeded the 260 scfm value assumed in the current CR dose analysis. However, based on the sensitivity calculation, the current inleakage would result in a 30 day thyroid dose of approximately 12.5 rem for CR personnel. This is well within the requirements of the 30 day thyroid dose requirements of GDC 19 and SRP 6.4, demonstrating that the CREVS is able to perform its design basis safety function.

Based upon the ability to maintain the CR at a positive pressure of 1/8" w.g. relative to all adjacent spaces, coupled with the fact that the CREVS is able to perform its design basis safety function, the CREVS LCO was exited at 2000 hours on November 3, 1996.

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C. CAUSE OF EVENT:

The root cause of this event was misapplication or interpretation of design inputs and regulatory requirements, in that the design of the system and the design requirements of the system were apparently not understood by the various authors of various revisions of the UFSAR, TS, and surveillance tests. Review of the UFSAR shows that the discrepancy between positive pressure being maintained in the CR as opposed to positive pressure being maintained in the CR emergency zone has existed the entire time that the system has been in operation.

A contributing factor was inadequate post modification testing. A review of the post modification testing does not show adequate differential pressure testing for either the CR or the CR emergency zone.

D. SAFETY ANALYSIS:

There was no potential impact to the health and safety of the public by this event. Gaseous releases to the environment are controlled by the primary and secondary containments, the off-gas and standby gas systems, the elevated stack, and other systems. The CR HVAC does not mitigate or contribute to gaseous releases to the environment.

The potential impact of the event on CR personnel is that, had a loss of coolant accident (LOCA) occurred, releasing radiation to the environment, the quantity of unfiltered air inleakage into the CR would have been higher than the 260 standard cubic feet per minute (scfm) utilized by the current CR dose analysis. However, the calculation performed to support operability demonstrated that a significantly higher inleakage is allowable than the value assumed in the CR dose analysis (inleakage infiltration rates in excess of thirty (30) times the UFSAR value of 260 scfm were found acceptable). The measured inleakage rate into the CR emergency zone was 275 scfm \pm 99 scfm after corrective actions were taken (per Interim Procedure IP 96-0182). Although the amount of inleakage prior to implementation of the corrective actions is not known, it is reasonable to conclude that GDC 19 limits would not have been exceeded for CR personnel, given the results / margin shown by the operability calculation.

The isolation mode of the CREVS (recirculation mode automatically entered upon detection of toxic gas) was not affected by this event. In addition, the smoke purge mode of the CREVS was not affected by this event.

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E. CORRECTIVE ACTIONS:

Corrective Actions Completed:

1. CREVS ductwork leaks were sealed.
2. Penetrations from the CR emergency zone to the surrounding areas were sealed.
3. Airflows were measured to verify design airflows.
4. QCOS 5750-02 was revised to measure the CR pressure in relation to adjacent areas. The revised surveillance was performed, and was completed on November 3, 1996, verifying that the CR was maintained at a positive pressure of 1/8" w.g.
5. Interim Procedure (IP) 96-0182 was written to measure unfiltered inleakage into the CR emergency zone. The test was performed, and was completed November 3, 1996, and demonstrated that the unfiltered inleakage into the CR emergency zone was 275 scfm \pm 99 scfm. (This is in excess of the 260 scfm inleakage reflected in UFSAR section 6.4.2.3).
6. A CR dose analysis sensitivity calculation was performed by NUS Scientific Corporation, which concluded that with the above inleakage of 275 \pm 99 scfm, CR personnel dose is less than GDC 19 requirements.
7. An operability evaluation was performed to analyze the above corrective actions and tests, with the conclusion that the CREVS was now operable.

Corrective Actions to be Completed:

1. Revise the CR dose analysis (CR Habitability), followed by the appropriate revisions to the UFSAR. In addition, review the TSs and bases for CREVS for potential revision / enhancement. Actions to be completed by April 7, 1997. (NTS #254-201-96-289225; System Engineering)
2. Establish a method to control breaching the CR emergency zone (similar to the controls placed on secondary containment breaches). Actions to be completed by March 3, 1997. (NTS #254-201-96-289226; System Engineering).
3. Measure CR differential pressures monthly and trend data. Based on trend data, extend surveillance intervals, if appropriate. Actions to be completed by March 1, 1997. (NTS # 254-201-96-289227; System Engineering).

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F. PREVIOUS EVENTS:

The following similar Licensee Event Reports (LERs) have occurred since 1995 regarding misapplication or interpretation of design inputs and regulatory requirements.

254/95-007 "The RPS scram discharge volume logic circuitry is designed such that a single component failure (in CLOSE position) to any one of the scram relays would prevent a full scram on a high SDV level due to an inadequate design."

254/96-012 "Diesel Fuel Oil Transfer Piping to the fire diesel day tanks does not meet seismic requirements and cannot be upgraded due to an inadequate design."

G. COMPONENT FAILURE DATA:

None.