

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 5				
Title (4) Operability calculations performed on Emergency Core Cooling System (ECCS) suction strainers with correct head loss values show that the design functions of the ECCS systems are met using a value of containment overpressure that is slightly greater than that shown in the Updated Final Safety Analysis Report (UFSAR).																			
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)									
									Quad Cities Unit 2	0 5 0 0 0 2 6 5									
1 2	2 3	9 6	9 6	-- 0 2 5	-- 0 0	0 1	2 2	9 7		0 5 0 0 0									
OPERATING MODE (9) Power Operation			THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (Check one or more of the following) (11)																
1			20.402(b)				20.405(c)				50.73(a)(2)(iv)				73.71(b)				
POWER LEVEL (10)			20.405(a)(1)(i)				50.36(c)(1)				50.73(a)(2)(v)				73.71(c)				
1 0 0			20.405(a)(1)(ii)				50.36(c)(2)				50.73(a)(2)(vii)				<input checked="" type="checkbox"/> 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 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:

This report is being submitted as a voluntary Licensee Event Report.

On 122096, during preparations for a design change to install new Emergency Core Cooling System (ECCS) suction strainers, it was discovered that the original value for the strainers head loss was incorrect. An operability evaluation and supporting calculations were performed in response to Problem Identification Form #96-3571. The Net Positive Suction Head (NPSH) calculations for the ECCS pumps, using the correct strainer head loss, determined that the ECCS pumps would have performed their design function during a design bases accident.

As the result of discussions concerning the differences between the overpressure values, the small NPSH margins and the likelihood that additional analyses may or may not show that the current Updated Final Safety Analysis Report (UFSAR) overpressure value could be used, Quad Cities conservatively elected to make an ENS notification. The NRC was notified by telephone on 122396 at 1552.

A 10CFR50.59 safety evaluation has been completed to revise the UFSAR to incorporate the correct value for the strainer head loss and reference to the 1993 containment overpressure analysis. No unreviewed safety question was identified by the 10CFR50.59 safety evaluation and the dose to the control room operators and the public would remain within design bases. Therefore, there was no safety significance for this event.

The root cause of the incorrect strainer head/loss could not be determined.

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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: Operability calculations performed on Emergency Core Cooling System (ECCS) suction strainers with correct head loss values show that the design functions of the ECCS systems are met using a value of containment overpressure that is slightly greater than that shown in the Updated Final Safety Analysis Report (UFSAR).

A. CONDITIONS PRIOR TO EVENT:

Unit: One	Event Date: December 23, 1996	Event Time: 1510
Reactor Mode: 1	Mode Name: Power Operation	Power Level: 100%
Unit: Two	Event Date: December 23, 1996	Event Time: 1510
Reactor Mode: 1	Mode Name: Power Operation	Power Level: 100%

This report was initiated by Licensee Event Report 254\96-025.

POWER OPERATION (1) - Mode switch in the Run position with average reactor coolant temperature at any temperature.

B. DESCRIPTION OF EVENT:

This report is being submitted as a voluntary LER.

On 122096, a 1983 vendor calculation that determined the structural adequacy of the Emergency Core Cooling System (ECCS)[BO, BM] suction strainers [STR] was discovered that identified the head loss across the ECCS suction strainers for both Unit 1 and 2 as 5.8 feet of water. This was not consistent with the Updated Final Safety Analysis Report (UFSAR) and original vendor drawings which have identified the head loss across the strainers as 1 foot of water since the original construction and operation of the plant. The above head loss values are for 10,000 gallons per minute (gpm) flow. Subsequent review of calculations revealed the 1983 calculation was correct. A problem identification form (PIF) was initiated and analysis was also initiated to determine the effect that an additional 4.8 feet of head loss may have on the ECCS pumps net positive suction head (NPSH) margin. An issue screening of PIF 96-3571 determined that the required design functions were met but a concern existed; therefore, a 24 hour operability evaluation was initiated.

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The NPSH calculations evaluated two time periods, i.e. short term (first 10 minutes of a design basis accident) and long term. The calculations determined during the short term, that with maximum ECCS flow (two core spray (CS) pumps at run out and four low pressure coolant injection (LPCI) pumps injecting into a pipe break) the CS pumps would start to cavitate in about eight minutes. For the long term the ECCS pumps would not cavitate when the pump flows are throttled by the operators as directed by the Emergency Operating Procedures (EOPs). Credit for containment overpressure was used for both the short term and long term analysis as described below. The flow rates used for ECCS pumps NPSH evaluation were conservatively higher than required to perform containment cooling and to provide adequate water to the core to maintain two thirds core height coverage. Based on this NPSH calculation the operability evaluation determined that the ECCS pumps were operable. The operability determination by operations concluded that the ECCS pumps were "operable, but degraded" and that no ENS call was required.

The Quad Cities NPSH calculation used the computer flow models developed for Dresden with corrections for differences between Dresden and Quad Cities Stations. The analysis performed in 1993 to determine the minimum containment overpressure that would be available in the long term used the models similar to those described in NRC Branch Technical Position CSB 6-1 as endorsed by NRC Information Notice 96-55. This analysis results in the minimum containment overpressure being slightly higher in the long term than the value shown in UFSAR Figure 6.3-42. The short term overpressure analysis also employed a methodology which conservatively minimized (lowered) the calculated containment overpressure available. This analysis was performed in November 1996 for the Dresden Station. An evaluation of the Dresden and Quad Cities parameters used as inputs verified that the Dresden analysis could be conservatively used for Quad Cities

As the result of discussions concerning the differences between the overpressure values, the small NPSH margins and the likelihood that additional analyses may or may not show that the current UFSAR overpressure value could be used, Quad Cities conservatively elected to make an ENS notification. The NRC was notified by telephone on 122396 at 1552.

A 10CFR50.59 safety evaluation was initiated to revise the UFSAR to reflect the approximately six feet of head loss for the ECCS suction strainers. During preparation of the safety evaluation it was also determined that the original containment overpressure information in the UFSAR could be revised to include the 1993 analysis. This is based on the original NRC safety evaluation report (SER) which accepted use of containment overpressure, dated 082571. Review of the Quad Cities submittal to the NRC and their SER dated 010477, reviewed the conditions of runout pump cavitation, was included in the 10CFR50.59 safety evaluation. It determined that no unreviewed safety question exists. Therefore, based on the UFSAR change the ECCS pumps are operable, and no longer considered degraded.

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C. APPARENT CAUSE OF EVENT:

The 1983 calculation was discovered during a Design Basis Review associated with a proposed modification to the ECCS suction strainers that will be installed to meet the requirements from NRC Bulletin 96-03. The ECCS suction strainers were modified as part of the Mark I containment program. The vendors structural calculation for the modification also evaluated the reduction in surface area and the resulting head loss increase from 5.5 feet to 5.8 feet. The 5.5 feet head loss was based on a reference to the vendor's 1981 calculation which was determined from information provided by the original strainer supplier. The original strainer supplier could not locate records for the Quad Cities strainers but did provide date on testing of strainers for later vintage power plants.

The reason for the inaccuracy of the original one foot of water could not be determined. Therefore the root cause of the strainer suppliers incorrect information is unknown.

D. SAFETY ANALYSIS OF EVENT:

The safety significance of the event was minimal. If a design bases accident had occurred, the health and safety of the public and control room operators would not have been impacted by this event since the ECCS pumps would have performed their function.

If an event had occurred which required ECCS injection, sufficient containment overpressure would have been present to ensure that the ECCS pumps would provide adequate cooling to the core. Since the ENS call a 10CFR50.59 safety evaluation has been completed to revise the UFSAR to incorporate by reference later long term containment overpressure analysis. Information was uncovered on CS and LPCI pump cavitation testing that indicates that cavitation operation of the pumps for a short time will not damage the pumps. This information was reviewed and was accepted by the NRC in their 1977 SER.

In conclusion, there is no safety significance of this event since the ECCS pumps would have performed their safety function and that the NPSH calculations are within Quad Cities design bases as evaluated in the UFSAR safety evaluation.

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E. CORRECTIVE ACTIONS:

Corrective Action Completed:

1. As a compensatory action, just in time training was provided for operators to recognize pump cavitation during design basis accidents. This was performed prior to each person assuming shift duties.
2. As a compensatory action, QCOP 1000-30, "Post-Accident RHR Operation" has been revised to provide direction to throttle flow rate when pump cavitation is indicated and provide caution to assure core cooling.
3. A 10CFR50.59 safety evaluation has been prepared to update the UFSAR to show that the ECCS suction strainers have a head loss of approximately 6 feet at 10,000 gpm and add reference to the long term containment overpressure analysis. Safety evaluation SE-97-001 for UFSAR change completed 011097.

Corrective Actions To Be Completed:

1. The site Plant Operations Review Committee will determine how much, if any to lower the administrative limits for torus water temperature, to improve NPHS margin in the actual plant response to design bases event(s). Correlation between initial torus water temperature and NPSH margin will be determined prior to 033197. (NTS 2541809602501, Design Engineering)

F. PREVIOUS EVENTS:

A search was conducted for prior similar occurrences of this event relating to the ECCS suction strainers. No previous events were found.

G. COMPONENT FAILURE DATA:

Not applicable.