LICENSEE EVENT REPORT (LER) Form Rev. 2.0

Facility Name (1)	Docket Number (2)	Page (3)
Quad Cities Unit	0 5 0 0 0 2 5 4	1 of 0 5

Title (4) The inaccuracy of the Control Room Emergency Ventilation System (CREVS) Air Filtration Unit (AFU) airflow instrument, resulted in the AFU airflow rate and AFU differential pressure exceeding Technical Specification (TS) limits.

Event Date (5)			LER Number (6)				Report Date (7)			Other Facilities Involved (8) Docket Number(s)								
Month	Day	Year	Year	Sequential Number		Revision Number	Month	Day	Year	Facility Names	0	5	0	0	0	2	6	5
1 0	0 8	1998	1998	0 2 3		0 0	1 1	0 6	1998	QC Unit 2	0	5	0	0	0			

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)	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 in Abstract below and in Text		
			20.405(a)(1)(iii)		50.73(a)(2)(i)		50.73(a)(2)(viii)(A)				
			20.405(a)(1)(iv)		50.73(a)(2)(ii)		50.73(a)(viii)(B)				
			20.405(a)(1)(v)		50.73(a)(2)(iii)		50.73(a)(2)(x)				

LICENSEE CONTACT FOR THIS LER (12)

Name	TELEPHONE NUMBER AREA CODE
Charles Peterson, Regulatory Affairs Manager, ext. 3609	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 EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

SUPPLEMENTAL REPORT EXPECTED (14)		Expected Submission Date (15)	Month	Day	Year
☐ YES (If yes, complete EXPECTED SUBMISSION DATE)	☒ NO				

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

ABSTRACT: At 0200 on 10081998, Unit 1 was at 100% power, and Unit 2 power was at 74% and, decreasing in preparation for a recirculation system pump seal replacement. At this time, Train B of the Control Room Emergency Ventilation System (CREVS) was declared inoperable during the performance of QCOS 5750-11, Control Room Emergency Filtration System 18 Month Test. At the time of this event, the CREVS was in a planned 7-day Limiting Condition for Operation (LCO). During the surveillance, the differential pressure (d/p) across the CREVS Air Flow Unit (AFU) exceeded the d/p limit allowed by the Technical Specifications (TSs). Additionally, Control Room (CR) envelope d/p readings obtained during the surveillance, indicated that the CR envelope could not meet the positive pressure requirements of the TSs when the CREVS was operated in the Pressurization Mode.

The investigation revealed that the high d/p across the AFU was due to an excessive AFU airflow rate. The excess flow rate was caused when an inaccurate local AFU flow indication was used to adjust the AFU airflow rate. The AFU airflow rate was subsequently adjusted to within the required TS limits, which corrected the AFU high d/p problem. CR envelope d/p readings, originally thought to be out of specification, proved to be invalid. Prior to air flow rate adjustments to correct the AFU high d/p condition, CR envelope pressure readings were retaken and shown to be within TS limits. Subsequent readings, taken after the AFU airflow rate was adjusted, confirmed CR positive pressure TS requirements were met.

The root causes for this event were: (1) failure to take effective corrective action to resolve the inaccuracy of the local AFU flow instrument caused in part, by programmatic weaknesses in trending CREVS component problems and (2) maintenance personnel assigned to obtain d/p readings of the CR envelope were not adequately trained on the use of the absolute pressure instruments.

The safety significance of this event was minimal. The CR positive pressure envelope was always maintained. With an AFU airflow rate slightly higher than allowed by the TSs, there would have been an insignificant change to CR operator dose. The health and safety of the general public and CR personnel was not affected.

PLANT AND SYSTEM IDENTIFICATION:
General Electric - Boiling Water Reactor - 2511 MWt rated core thermal power.

EVENT IDENTIFICATION: : The inaccuracy of the Control Room Emergency Ventilation System (CREVS) Air Filtration Unit (AFU) airflow instrument, resulted in the AFU airflow rate and AFU differential pressure exceeding Technical Specification limits.

A. CONDITIONS PRIOR TO EVENT:

Unit:	One	Event Date:	10081998	Event Time:	0200
Reactor Mode:	One	Mode Name:	Power Operation	Power Level:	100%

Unit:	Two	Event Date:	10081998	Event Time:	0200
Reactor Mode:	One	Mode Name:	Power Operation	Power Level:	74%

This report was initiated by Licensee Event Report 254/98-023

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

B. DESCRIPTION OF EVENT:

At 0200 on 10081998, Unit 1 was at 100% power, and Unit 2 power was at 74% and, decreasing in preparation for a recirculation system pump seal replacement. At this time, Train B of the Control Room Emergency Ventilation System (CREVS) was declared inoperable during the performance of QCOS 5750-11, Control Room Emergency Filtration System 18 Month Test. The CREVS AFU differential pressure (d/p) was found to be 6.7 inches water gauge (wg), which exceeds the TS limit of <6.0 inches wg. Additionally, the d/p readings of portions of the Control Room (CR) envelope indicated that the TS requirements for CR envelope positive pressure could not be met when the CREVS was operated in the Pressurization Mode.

A four (4) hour ENS phone call was made at 0547 (CDT) on 10081998, to report the failed surveillance and Problem Identification Form (PIF) number Q1998-04292 was initiated to document the failed surveillance.

At approximately 1000 on 10081998, the CR envelope pressure readings were reviewed by System Engineering. The first set of data taken was considered suspect. Therefore, CR envelope d/p readings were retaken with personnel more experienced in the use of the absolute pressure indicators. Retesting confirmed that TS requirements for CR envelope positive pressure were met.

At approximately 1500 on 10081998, the AFU airflow rate was measured using a pitot tube traverse. The measured AFU airflow was 2281 standard cubic feet per minute (scfm), which exceeded the TS requirement of 2000 scfm $\pm$10%. At the time the AFU airflow rate was measured by pitot tube traverse, the local AFU flow instrument was indicating an AFU airflow rate of approximately 1975 scfm. The high AFU flow rate resulted in the high AFU d/p.

At approximately 2300 on 10081998, the AFU airflow rate was adjusted to approximately 2000 scfm. The AFU airflow adjustment lowered the AFU d/p to 5.7 inches wg, which met the <6 inches wg TS requirements. After the AFU airflow rate was adjusted, the normally installed AFU flow instrument registered a reading of 1675 scfm, revealing a substantial difference between the indicated and actual airflow rate.

At approximately 0400 on 10081998, the installed AFU airflow rate instrument was adjusted to agree with the actual AFU airflow rate.

At approximately 1000 on 10091998, all CR envelope d/p readings were retaken to confirm that the CR envelope positive pressure requirements could still be met after the AFU airflow rate was adjusted. CR envelope d/p readings, following the AFU airflow adjustment, met the $\geq$ 1/8 inch wg TS requirement.

Surveillance procedure QCOS 5750-11 was subsequently completed satisfactorily.

C. CAUSE OF THE EVENT:

The AFU airflow rate is checked and adjusted by operators when the AFU is placed in operation. The locally installed AFU airflow instrument is used to adjust the AFU flow when required. Since the installed flow instrument was indicating an airflow rate lower than the actual airflow rate, due to instrument inaccuracy, adjustments were made based on an inaccurate flow indication which caused the actual airflow rate to be excessive. The investigation revealed that the normally installed AFU flow instrument had a history of inaccuracy. No corrective action to resolve the inaccuracy of the locally installed AFU flow instrument was ever taken. The lack of corrective action was caused in part, by programmatic weaknesses in trending available PIF information for the CREVS. The investigation concluded that repetitive problems with CREVS components are not being effectively evaluated for long-term trends.

Instrument Maintenance personnel assigned to obtain differential pressure readings of the CR envelope were not adequately trained on the use of the absolute pressure instruments.

D. SAFETY ANALYSIS:

The CREVS does not mitigate the consequences of off-site dose, therefore the offsite dose would not be affected. The health and safety of the general public was not affected.

The safety significance of this event was minimal. Operation of the CREVS AFU with an airflow rate slightly higher than the TS requirement of 2000 $\pm$10% would not have significantly impacted the dose to the CR operators. The high AFU airflow rate did not exceed the individual design d/p limits for any AFU component. The overall AFU design d/p is 8.0 inches wg. The 6.7 inches wg d/p observed during the surveillance was below the AFU d/p

design limit. Therefore, the AFU would have performed as designed and removed the requisite amounts of particulate airborne radioactivity had a Loss of Coolant Accident (LOCA) occurred in this condition.

The d/p readings of the CR envelope, which initially indicated that the CR envelope could not be pressurized to the TS limit of ≥ 1/8 inch wg, proved to be invalid. Retaking the Control Room envelope d/p readings, prior to any flow rate adjustments, verified that the CR envelope could be pressurized to at least 1/8 inch wg. Had a LOCA occurred in this condition, the CR envelope would have met the positive pressure requirement in the Control Room Habitability Study. After the AFU airflow rate was adjusted to meet TS requirements, the CR d/p readings were verified to meet the ≥ 1/8 inches wg criteria.

The slightly higher AFU airflow rate would have resulted in a slightly shorter residence time for radioactive material not removed by the mechanical filters. The amount of unfiltered in-leakage, assumed to occur in the current Control Room Habitability Study, is 260 scfm. CREVS in-leakage testing performed at the station on Train B, determined an actual unfiltered in-leakage rate of 88 scfm. Based on the difference between an actual flow rate of 2281 scfm and the TS limit of 2200 scfm, excess CREVs flow amounted to 81 scfm. Assuming the extra 81 scfm of AFU flow is treated as unfiltered in-leakage (conservative assumption), the total amount of unfiltered in-leakage can be assumed not to exceed 169 scfm. This assumed total inleakage of 169 scfm is less than the 260 scfm used in the current Control Room Habitability Study. Therefore, it can be concluded that, in the event of a LOCA, dose to the CR operators would have been bounded by the Control Room Habitability Study.

The health and safety of the general public and CR personnel was not affected.

E. CORRECTIVE ACTIONS:

Corrective Actions Completed:

1. The AFU airflow rate was adjusted to meet the TS requirements. This action corrected the high AFU d/p condition.

2. The locally installed AFU airflow indicator was adjusted to indicate the actual AFU airflow rate.

3. The Control Room envelope d/p readings were verified to meet the TS requirement.

4. Procedure Field Changes for QCOP 5750-09, "Control Room Ventilation System" and QCOS 5750-02, "Control Room Emergency Filtration System Monthly Test" have been approved and implemented to prevent operation of the AFU inlet damper, unless the actual flow rate has been determined by the pitot tube traverse method.

Corrective Actions to be Completed:

1. The installed AFU flow indicating system will be evaluated for improvements necessary to improve operation by 01081999. Issues to be evaluated are the current calibration frequency of existing flow indicator, the use of an improved flow indication system and whether the installed flow indicator should be abandoned. (NTS 25418098SCAQ00023.03/System Engineering)

2. Operating and surveillance procedures, which involve operation of the AFU, will be revised by 01151999, to require that the AFU makeup airflow be verified by a pitot tube traverse if it is suspected that AFU inlet damper requires adjustment. (NTS 25418098SCAQ00023.04/System Engineering)

3. QCOS 5750-11 will be revised by 01151999, to provide more detailed guidance for taking CR envelope differential pressure readings with absolute pressure indicators. (NTS 25418098SCAQ00023.05/System Engineering)

4. Appropriate Instrument Maintenance personnel will be trained on the operation of absolute pressure indicators. This training will be completed by 08151999. (NTS 25418098SCAQ00023.02/Training Department)

F. PREVIOUS OCCURRENCES:

A search of LERs over the past three years identified the following event:

LER 254/96-023, The Control Room Emergency Filtration system failed to maintain required airflow due to a cognitive personnel error, which allowed the flow instrument loop to be incorrectly calibrated.

G. COMPONENT FAILURE DATA:

No component failures were associated with this event.