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Quad Cities Nuclear Power Station
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January 18, 2008

SVP-08-006

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Quad Cities Nuclear Power Station, Units 1 and 2
Renewed Facility Operating License Nos. DPR-29 and 30
NRC Docket Nos. 50-254 and 50-265

Subject: Licensee Event Report 254/07-003, "Safety Function Not Met Due to Control Room Emergency Ventilation System Air Filtration Unit Heater Flow Switch Failure"

Enclosed is Licensee Event Report (LER) 254/07-003, "Safety Function Not Met Due to Control Room Emergency Ventilation System Air Filtration Unit Heater Flow Switch Failure," for Quad Cities Nuclear Power Station, Units 1 and 2.

This report is submitted in accordance with the requirements of the Code of Federal Regulations, Title 10, Part 50.73(a)(2)(v)(D), which requires the reporting of any event or condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident.

There are no regulatory commitments contained in this letter.

Should you have any questions concerning this report, please contact Mr. W. J. Beck at (309) 227-2800.

Respectfully,



Timothy J. Tulon
Site Vice President
Quad Cities Nuclear Power Station

cc: Regional Administrator – NRC Region III
NRC Senior Resident Inspector – Quad Cities Nuclear Power Station

JE22
NRR

LICENSEE EVENT REPORT (LER)

(See reverse for required number of
digits/characters for each block)

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

1. FACILITY NAME

Quad Cities Nuclear Power Station Unit 1

2. DOCKET NUMBER

05000254

3. PAGE

1 OF 4

4. TITLE

Safety Function Not Met Due to Control Room Emergency Ventilation System Air Filtration Unit Heater Flow Switch Failure

5. EVENT DATE

MONTH	DAY	YEAR
11	20	07

6. LER NUMBER

YEAR	SEQUENTIAL NUMBER	REV NO.
2007	- 003	- 00

7. REPORT DATE

MONTH	DAY	YEAR
01	18	2008

8. OTHER FACILITIES INVOLVED

FACILITY NAME	DOCKET NUMBER
Quad Cities Unit 2	05000265
N/A	N/A

9. OPERATING MODE

1

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)

- | | | | |
|---|---|---|---|
| <input type="checkbox"/> 20.2201(b) | <input type="checkbox"/> 20.2203(a)(3)(i) | <input type="checkbox"/> 50.73(a)(2)(i)(C) | <input type="checkbox"/> 50.73(a)(2)(vii) |
| <input type="checkbox"/> 20.2201(d) | <input type="checkbox"/> 20.2203(a)(3)(ii) | <input type="checkbox"/> 50.73(a)(2)(ii)(A) | <input type="checkbox"/> 50.73(a)(2)(viii)(A) |
| <input type="checkbox"/> 20.2203(a)(1) | <input type="checkbox"/> 20.2203(a)(4) | <input type="checkbox"/> 50.73(a)(2)(ii)(B) | <input type="checkbox"/> 50.73(a)(2)(viii)(B) |
| <input type="checkbox"/> 20.2203(a)(2)(i) | <input type="checkbox"/> 50.36(c)(1)(i)(A) | <input type="checkbox"/> 50.73(a)(2)(iii) | <input type="checkbox"/> 50.73(a)(2)(ix)(A) |
| <input type="checkbox"/> 20.2203(a)(2)(ii) | <input type="checkbox"/> 50.36(c)(1)(ii)(A) | <input type="checkbox"/> 50.73(a)(2)(iv)(A) | <input type="checkbox"/> 50.73(a)(2)(x) |
| <input type="checkbox"/> 20.2203(a)(2)(iii) | <input type="checkbox"/> 50.36(c)(2) | <input type="checkbox"/> 50.73(a)(2)(v)(A) | <input type="checkbox"/> 73.71(a)(4) |
| <input type="checkbox"/> 20.2203(a)(2)(iv) | <input type="checkbox"/> 50.46(a)(3)(ii) | <input type="checkbox"/> 50.73(a)(2)(v)(B) | <input type="checkbox"/> 73.71(a)(5) |
| <input type="checkbox"/> 20.2203(a)(2)(v) | <input type="checkbox"/> 50.73(a)(2)(i)(A) | <input type="checkbox"/> 50.73(a)(2)(v)(C) | <input type="checkbox"/> OTHER |
| <input type="checkbox"/> 20.2203(a)(2)(vi) | <input type="checkbox"/> 50.73(a)(2)(i)(B) | <input checked="" type="checkbox"/> 50.73(a)(2)(v)(D) | |

Specify in Abstract below
or in NRC Form 366A

10. POWER LEVEL

97%

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME

Wally Beck - Regulatory Assurance Manager

TELEPHONE NUMBER (Include Area Code)

(309) 227-2800

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
B	VI	FS	Columbus Electric	Y					

14. SUPPLEMENTAL REPORT EXPECTED

☐ YES (If yes, complete 15. EXPECTED SUBMISSION DATE)☒ NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR
N/A	N/A	N/A

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On November 20, 2007, at 0505 hours during full power operation, Operation's surveillances determined that the Control Room Emergency Ventilation System (CREVS) (also described as Train B Control Room HVAC), Air Filtration Unit (AFU) heaters were not operating as required. The surveillance requirement for Technical Specification (Tech Spec) 3.7.4 is a 10 hour run to be performed once every 31 days with the heaters operating. CREVS was declared inoperable and Tech Spec Limiting Condition for Operation 3.7.4, Action A, was entered which requires the CREVS to be restored to operable status in seven days. This event was reported to NRC on November 20, 2007, per 10CFR50.72(b)(3)(v)(D), (ENS Number 43793), as an event of condition that could have prevented the fulfillment of a safety function, because the CREVS is a single train system required to mitigate the consequences of an accident.

Troubleshooting of the AFU heater indicated that flow switch FS 0-5795-350 had an open contact that was preventing the heater from energizing and operating as required. By 1625 hours this flow switch was replaced, retested satisfactorily, CREVS was declared operable, and Tech Spec 3.7.4, Action A, was exited.

Initial failure analysis indicated a problem with the open switch contact which would not close when it reached its setpoint on several different occasions when tested. The resultant failure is attributed to infant mortality, since this switch had only been installed for one month and its failure occurred during its second installed actuation. This is the first issue the station has had with this make and model flow switch since its initial installation in 1985. There were no plant or public safety consequences as a result of this event.

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NARRATIVE

PLANT AND SYSTEM IDENTIFICATION

General Electric - Boiling Water Reactor, 2957 Megawatts Thermal Rated Core Power

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

EVENT IDENTIFICATION

Safety Function Not Met Due to Control Room Emergency Ventilation System Air Filtration Unit Heater Flow Switch Failure

A. CONDITION PRIOR TO EVENT

Unit: 1 Event Date: November 20, 2007 Event Time: 0505 hours
Reactor Mode: 1 Mode Name: Power Operation Power Level: 97%

B. DESCRIPTION OF EVENT

On November 20, 2007, at 0505 hours during full power operation, Operations surveillances determined that the Control Room Emergency Ventilation System (CREVS) [VI] (also described as Train B Control Room HVAC), Air Filtration Unit (AFU) [AHU] heaters [EHTR] were not operating as required. The surveillance requirement for Technical Specification (Tech Spec) 3.7.4 is a 10 hour run to be performed once every 31 days with the heaters operating. CREVS was declared inoperable and Tech Spec Limiting Condition for Operation 3.7.4, Action A, was entered which requires the CREVS to be restored to operable status in seven days. This event was reported to NRC on November 20, 2007, per 10CFR50.72(b)(3)(v)(D), (ENS Number 43793), as an event of condition that could have prevented the fulfillment of a safety function, because the CREVS is a single train system required to mitigate the consequences of an accident.

Troubleshooting of the AFU heater indicated that flow switch [FS] FS 0-5795-350 had an open contact [29] that was preventing the heater from energizing and operating as required. All other relays [RLY], switches [IS], and contacts in the AFU heater circuit were found to be operating satisfactorily. By 1625 hours, FS 0-5795-350 had been replaced, proper operation of the flow switch and the AFU heaters was demonstrated, CREVS was declared operable, and Tech Spec 3.7.4, Action A, was exited.

Flow switch FS 0-5795-350 is designed to close and allow the heater to operate if the flow through the AFU is sufficient to support the operation of the heater. The heater coils [HCL] require a minimum flow of approximately 1600 cfm (normal flow is 2000 cfm) such that the heater coils do not trip or burn out. FS 0-5795-350 is a Columbus Electric Manufacturing Model RH15-05-D1 flow switch. This flow switch had been replaced and successfully tested on October 24, 2007. The AFU had not been operated from October 24, 2007 until November 20, 2007, when the AFU heater was found not operating.

CREVS is a single safety-related ventilation system that feeds the control room envelope. CREVS contains a single air filtration unit that is designed to pull 2000 cfm of outside air and filters it through a pre-filter, HEPA filter [FLT], heater, and charcoal adsorber [ADS]. The 2000 cfm is required to pressurize the control room envelope to 1/8 inch water gauge. The AFU heater is specifically designed to reduce the relative humidity of the air traveling to the

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charcoal adsorbers to less than 70%. A relative humidity (RH) of less than 70% increases the efficiency of the charcoal adsorber in removing radioactive iodide from the air. Maintaining a relative humidity of less than 70% ensures that Tech Spec 5.5.7.c (Ventilation Filter Testing Program) is met, which requires that methyl iodide penetration is less than 0.5%, when tested at 30°C and 70% RH.

Flow switch FS 0-5795-350 is correctly classified and preventive maintenance tasks were being performed correctly per the maintenance template for air handling units. System monitoring and trending data for the AFU heater revealed no signs of degradation. No operating experience information could be found on switches failing within one month of operation. The operating procedures for the CREVS AFU are sufficient and within the design basis for the components. There have been no previous issues with the quality of parts obtained for this application. Exelon Powerlabs initial failure analysis identified an issue with the open switch contact, in that when testing it would not close when it reached its setpoint on several different occasions. This is an infant mortality issue, given the fact that this was only the second time the switch was required to operate after installation.

C. CAUSE OF EVENT

Flow switch FS 0-5759-350 was installed as part of a preventive maintenance task on October 23, 2007. The flow switch was then successfully tested on October 24, 2007. The AFU had not been operated from October 24, 2007 until November 20, 2007, when the AFU heater was found not operating. During troubleshooting on November 20, 2007, Instrument Maintenance (IM) removed the flow switch sensing line, and upon reinstallation the flow switch contact could be heard going closed. IM was unable to recreate the open contact condition.

Exelon Powerlabs initial failure analysis indicated a problem with the open switch contact which would not close when it reached its setpoint on several different occasions when tested. The resultant failure is attributed to infant mortality, since this switch was only installed for one month and its failure occurred during its second installed actuation. This is the first issue the station has had with this make and model flow switch since its initial installation in 1985.

D. SAFETY ANALYSIS

The safety significance of this event was minimal. Despite the loss of the AFU heater, the charcoal adsorber methyl iodide removal efficiency was sufficient to meet the Tech Spec requirements and there would be no impact to any control room dose calculations or assumptions.

The flow switch used to control the operation of the CREVS AFU heater is a Columbus Electric Manufacturing Model RH15-05-D1. This model switch is not used in any other application at Quad Cities Station. Consequently, impact of this condition with the plant operating was minimal.

E. CORRECTIVE ACTIONS

- FS 0-5795-350 was replaced with a new switch.
- The Exelon Powerlabs failure analysis final report will be reviewed to identify and initiate any additional necessary corrective actions.

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F. PREVIOUS OCCURRENCES

There were no previous occurrences at Quad Cities Station that involved failure of this flow switch. This is the first issue the station has had with this make and model flow switch since its initial installation in 1985. There was a prior degraded heater event on October 12, 2005 at Quad Cities in which the AFU heater was found degraded. This event is, however, not applicable as a previous occurrence since the AFU heater was found degraded due to issues with Measurement and Test Equipment (M&TE) instruments that were being used to measure voltage and amps on the heater. When two different M&TE instruments were used, the heater was found to be operating properly.

G. COMPONENT FAILURE DATA

The flow switch used to control the operation of the CREVS AFU heater is a Columbus Electric Manufacturing Model RH15-05-D1. This make and model switch is not used in any other application at Quad Cities Station. The Standby Gas Treatment System contains an electric heater that is started based on a flow switch. However, this flow switch is a Rosemount model flow switch.

An EPIX/NPRDS search identified Palo Verde 1 – Failure Number 811 (6/7/2005) Fuel Building AFU heaters failed to operate due to a failed flow switch. This failure is partially applicable to the Quad Cities event in that the switch was the same make and model flow switch as used in the Quad Cities CREVS AFU heater circuit. However, the Palo Verde failure mode was thermal degradation due to age of the switch diaphragm. The Palo Verde switch had been installed for 15 years when the failure occurred. The Quad Cities flow switch had been installed for one month when the failure occurred.